CHNOLOGY DEPT:

'It's Important to Know In Time'

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The Newspaper of the Industry

Air Conditioning & REFRIGERATION NEWS

Production Tools for Victory

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Technical Governmental

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DETROIT

Inside Dope

By George F. Taubeneck

Long Wait for Home Refrigerators
Motors and Freon
Over the Hump on Food
Luftwaffe's Dilemma
Pacific War May Last Awhile
Ice Cream's Future
War Spending
Demobilization

Long Wait for Home Refrigerators

It now appears almost positive that there will be no new household mechanical refrigerators marketed this year.

As stated here previously, the military authorities—who are running the show in Washington, and no fooling—have turned thumbs down on resumption of civilian manufacturing on such items as refrigerafors "until the success of the Invasion is assured."

Inasmuch as leading authorities in the industry state that it will take from six to nine months to get into production of refrigerators after individual manufacturers have received authorization to go ahead and have obtained the necessary materials, it would seem that 1944 will be a "lost year" for the industry.

Except for sheet steel, fractional horsepower motors, and Freon-12, the materials are now available. And, in some localities, labor might be found.

But, no soap. Nobody in the War Production Board wants to challenge the Army-Navy position for this good reason: If the Invasion doesn't go well, they could be blamed.

Motors and Freon

Fairly soon the sheet steel supply should loosen a bit. But, so long as the aviation program continues to accelerate, fractional horsepower motors—which perform all sorts of functions on airplanes—will be in terrific demand.

As for Freon-12, the needs of the Aerosol program—which have consistently been underestimated by the military planners—plus certain can't-be-told requirements of secret weapon plants—will preempt the bulk of the dichlordifluoromethane supply until the last quarter of 1944.

This will be true despite the fact that new plants now a-building for the production of Freon-12 will increase the nation's capacity by at least 60% (it was stepped up 50% last year).

When you hear that malaria has incapacitated far more of our soldiers and sailors and Marines in the Pacific theatre than have the Japs, and that vast areas of that "theatre" have not yet received any of the mosquito-murdering Aerosol, you certainly can't begrudge the demands of that program on the Freon-12 supply.

Over the Hump On Food

If the American public will just go ahead with its gigantic Victory garden plantings this year, most food administrative officials believe that we'll be "over the hump" as far as our food supply goes.

Evidence that civilians have accumulated extraordinary home stocks of canned goods—both the commercial and home-canned varieties—is to be had in plenty. Commercial canners even report, with some bitterness, that sales on many items are unseasonably slow.

Meat stocks continue to be embarrassingly high—accentuated by the fact that refrigerated storage facilities are glutted. Despite plenty of warnings given last year, ade-

(Concluded on Page 17, Column 1)

Better Business Bureau Questions Gadget Claim

University Tests Show Up Negatively

ST. LOUIS—The Better Business Bureau questions claims made for the "Refrig-O-Master," the box-like device advertised for installation in a household refrigerator to increase refrigerating effect, reduce running time, retard ice and frost formation, and maintain humidity equilibrium—and thus keep the refrigerator in operation longer and without service calls.

"Refrigeration experts and scientists have informed the Bureau that some of the claims made are diametrically opposed and contrary to known laws of science," states the bureau. "A laboratory test furnished by the distributor was condemned as being meaningless because of the methods used.

"At the request of the Bureau, tests for current consumption were made by the Mechanical Engineering Department of Washington University and it was stated these tests proved that the device did not cut current consumption or reduce the operating cost. Additional tests are being made to determine the effect upon moisture content," declared the St. Louis bureau.

The National Better Business Bureau is cooperating with the Better Business Bureau of Los Angeles to conduct an investigation of the device, according to the St. Louis bureau.

Members of the St. Louis section of the American Society of Refrigerating Engineers have been pushing the investigation.

The "Refrig-o-master" consists of a hard outer-finished cardboard box one inch deep, with 5 x 9 inch grilled faces. Inside are two layers of cheesecloth, held by a frame similar to the outer one. On the bottom are two suction cups to hold the unit in place on the inner wall of a refrigerator.

This box is filled with calcium silicate and carbonate, which is practically insoluble in water, but which will absorb water mechanically. Numerous small stones were found in samples tested.

Instructions packed with the article tell the housewife to move the temperature control on her refrigerator down to a point just above the "defrost" line after installing "Refrig-o-master." Without doubt that will reduce the unit's running time, but will it then refrigerate properly?

Typical "Refrig-O-Master" advertisement, with claims for "reduced operating cost," and "save food by preserving moisture content."

FTC Report Calls 'Direct to Dealer' 'More Efficient'

WASHINGTON, D. C.—An attack "by inference" on wholesaling of electrical appliances has been noted in the Federal Trade Commission's recently issued report to Congress on merchandising methods and costs of appliances, petroleum products, automobiles, tires and tubes, and farm machinery.

The report is part of a study being made by the FTC of the nation's peacetime merchandising setup.

The report makes use of the debatable term "efficient" in declaring that whereas the cost of distribution for household electrical appliances from the manufacturer through the wholesaler to the consumer was 60.11, two "efficient" manufacturers selling directly to dealers had a total cost of distribution of 57.59 cents on the sales dollar, and showed a greater profit.

Part of the text of the report

(Concluded on Page 32, Column 1)

Program Set For Toronto Meeting

TORONTO, Ont., Canada—With "Postwar Opportunities" the theme, the two-day Fifth Annual Conference of the Interprovincial Association of R.S.E.S. will be held here Sunday and Monday, March 19 and 20, at the King Edward hotel.

Papers and discussions to be presented at the conference cover a wide variety of subjects, including many of a technical nature.

Following is the announced program for the conference:

SUNDAY MORNING, MARCH 19

Registrations.

President opens the Conference.

(Concluded on Page 4, Column 5)

Training Setup Is In Operation On Wide Scale

But Director Says It Won't Be Enough; Cites Need For Deferments

WASHINGTON, D. C.—The National Refrigeration Manpower and Training Program will undoubtedly result in the training of more than 5,000 men in refrigeration service work, according to a formal report of the National Refrigeration Service Manpower Committee made here last week by W. Ray Kromer, Director of Training.

However, Mr. Kromer warned that "while this number of trainees, collectively, may appear large, it represents actually replacement for only about 12% of the men lost . . . this being based on the fact that these trainees cannot be more than 50% efficient immediately, which will reduce the 5,000 to approximately 2,500 in terms of actual replacements."

Mr. Kromer urged all possible efforts to retain experienced skilled servicemen in their jobs, pointing out that many letters he has received show that local draft boards have, without giving the cases much consideration, reclassified and inducted many servicemen of long experience in the field.

Following are excerpts from Mr. Kromer's report:

1. Temporary Program Coordinators are active in the following cities:

Birmingham, Ala., Phoenix, Ariz., Pine Bluff, Ark., Los Angeles, Calif., San Francisco, Calif., Denver, Colo., Bridgeport, Conn., Hartford, Conn., Waterbury, Conn., Orlando, Fla., Pensacola, Fla., St. Petersburg, Fla., Ottawa, Ill.

Peoria, Ill., Ft. Wayne, Ind., Indianapolis, Ind., South Bend, Ind., Centerville, Ia., Mason City, Ia., Great Bend, Kan., Wichita, Kan., New Orleans, La., Hagerstown, Md., Lynn, Mass., Worcester, Mass.

Alpena, Mich., Iron Mountain, Mich., Manistique, Mich., Three Rivers, Mich., Duluth, Minn., Fergus Falls, Minn., Minneapolis, Minn., Jop-

(Concluded on Page 4, Column 4)

Who Will Be Allowed To Produce For Civilians?

Dinegar Asks 'Why Not Let New Firms Produce?'

NEW YORK CITY—Manufacturers may be permitted to enter new product lines while old producers of similar lines are still engaged in war production, it was stated here Feb. 29 by Henry A. Dinegar of the War Production Board's Office of Civilian Requirements.

If aircraft companies, or some other type of producers are affected by cutbacks after the end of the European phase of the war, "and they display ingenuity enough to produce a washing machine or some other type of appliance," he said, it is highly improbable that they will be restrained from entering upon such production when materials are available."

In planning reconversion to civilian production, WPB cannot attempt to hold back civilian output until all manufacturers are able "to start in the race on an even basis," Dinegar said, indicating that the agency's policy, as soon as military requirements permit, would be to allow resumption of civilian goods manufacture in whatever area or whatever plant is affected by major cutbacks.

Stressing, however, that he expressed "to a considerable extent only my own opinion," Dinegar told the Wholesale Stationers Assn.:

"At the present time it is impossible to give an entirely accurate statement of WPB policy on many important reconversion problems be-

(Concluded on Page 4, Column 3)

Prime Contractors Are Crying 'Unfair'

WASHINGTON, D. C.—The consumers' durable goods field—and that part embracing major appliances in particular—presents the "knottiest" problem in the reconversion picture, declared the "Wall Street Journal" in its March 6 issue.

"The Baruch report advises that, as far as possible, 'no manufacturer should be permitted to jump the gun on his competitors,' and efforts should be made to treat all alike," says the "Wall Street Journal" piece. "At the same time these objectives must not be permitted to interfere with war requirements or to hold back production of needed civilian items."

This, says the "Journal," calls for a how-and-when reconversion schedule that WPB so far has been unable to determine accurately. What the Board would like is a postwar adjustment plan to change war plants back to a peacetime basis with a maximum of fairness and a minimum of unemployment and complaints from industry.

Loudest "squawking" being heard now, says the "Journal," is from the prime contractors, the big firms which are still engaged in war work and will be the last to leave it. They have a fear that, by the time their government contracts end, their peacetime business will have been seriously infiltrated by smaller firms or by newcomers to the field.

"The only solution apparent now would be hard on civilians," says the

(Concluded on Page 4, Column 1)

Whiteside Sees Need To Continue Controls

NEW YORK CITY—A clash of opinion on whether postwar production should be restricted by the government or allowed to reach capacity as each factory completes war contracts developed at the American Retail Federation meeting last week here.

Arthur D. Whiteside, until recently vice chairman of the War Production Board, advocated government control extending two or three years after the war, with quotas based on 1939 production.

"If we let manufacturers loose now to produce what they want to, I don't know what we would do at the end of the war," he declared.

Fred Lazarus, Jr., Columbus, Ohio, retailer and chairman of the Retail Federation Board, opposed the quota system as against "the best interests of the country." He said the public cannot recognize "the vested right of any manufacturer in a 1944 market" because he sold that percentage of goods in a previous year.

"We cannot get a $135 billion national economy out of quotas set on an $80 billion economy," he added.

Mr. Lazarus recommended that any manufacturer who completes his war contract commitments be permitted to go directly into whatever civilian production he likes without restriction of materials or output.

Mr. Whiteside suggested a four-point reconversion policy:

(Concluded on Page 4, Column 3)

WPB Exempts Motors Used In Replacement From New Priority

WASHINGTON, D. C.—Priority rating on fractional horsepower electric motors has been jumped from A-1-c to AA-5 by a WPB amendment to the General Industrial Equipment Order L-123, but dealers or repairmen who replace a householder's non-operative but repairable electric motor with another motor may replace their stock without need for a priority rating, according to a War Production Board announcement.

Specific authorization for replacement of small electric motors is contained in Paragraph (10) of the order, which reads as follows:

"When a fractional horsepower electric motor or generator is delivered to a householder or other user solely for replacement of a used one which needs repair and the seller, in accordance with his regular business practice, takes the broken down or defective motor or generator in trade and repairs it or delivers it to another person who will repair it (whenever repair is practicable) so that it will be resold under similar

(Concluded on Page 32, Column 4)

Branch Operations More Probable Than 'Mushrooming' of Dealers, Say Experts

NEW YORK CITY — Expected postwar increase in volume of retail sales, especially durable goods, will entail acquisition of new capital by retailers, establishment of new branch outlets to cope with decentralization and growth of outlying market areas, modernization of existing outlets, and placing of more stress on turnover for smaller model stocks, according to a recent survey of retailers in this area.

A definite step in that direction is being made by R. H. Macy & Co., Inc., it is believed, for recently the company announced plans to issue 500,000 shares of new preferred stock, some of which will go to present stockholders as dividends while the balance is to be sold for "cash or property." Macy's is apparently enlarging its capital structure to prepare for postwar expansion.

ABOUT REFRIGERATOR DEALERS—

Although greater volume of postwar sales will mean a greater number of retail outlets, particularly in the refrigeration and automotive fields, it is generally thought unlikely that there will be any "mushroom growth" in number of retail outlets, such as that which followed World War I. Expansion of retail outlets will probably occur through establishment of branch operations by firms already in business, it is believed.

Basis for believing in the tremendous postwar increase in retail sales is the estimated goal of $140,000,000,000 annual national income, which the Committee for Economic Development thinks necessary for the nation to maintain its present high standards of employment.

To reach this overall figure, retail sales will have to jump to about $75,000,000,000 a year, believes Dr. Paul H. Nystrom, professor of marketing at Columbia university here. Last year's all-time record high in retail sales was estimated at $62,900,000,000, while in the pre-war year of 1939 the volume was only $42,000,000,000.

20 BILLION IN NEW DISTRIBUTION?

The competition for the consumer's dollar, and the competition between outlets and the various brands to hit the $75 billion figure will require the investment of $20,000,000,000 of new capital in distribution, Dr. Nystrom also estimates. But, he says, this investment might be spread over a three-year period in the immediate post-war era.

It is generally believed that retail volume will increase in the postwar period, but whether it reaches the "ideal" high will depend on a number of important factors, a survey of business men reveals. Retailers, of course, will have to put forth extra effort, but perhaps the main question is whether employment can be maintained at its high level of today.

"New concepts" of production and distribution, as well as the introduction of new materials and development of new consumer needs may prove the answer to part of this problem.

'DOWNTOWN' STILL LIKELY

Despite the fact the decentralization of population groups will probably lead to establishment of branch outlets, there is little likelihood of retailers abandoning their extremely heavy investments in their centrally located stores. It is said that every effort will be made to revive these areas.

Large part of the effort to revive the "downtown" establishments will involve spending much of the $20,000,000,000 of estimated needed new capital for modernization, including exteriors, windows, lighting, fixtures, and altered store layout reports indicate.

SEE VAST CREDIT EXPANSION

Increased sales volume will also mean a rise in credit selling particularly of durable goods, it is said, with retailers finding less competition between soft and hard goods, but tremendous competition within the durable goods field as new firms and new products enter the market. Merchants anticipate big gains in private brands, they say.

Rapid turnover of goods is to be expected, for retailers will probably devote more and more attention to those lines which in the past, many have found, brought in 80% of their sales volume although the stock was only 20% of their total.

U. S. Chamber President To Address Institute

Eric Johnston, dynamic young president of the United States Chamber of Commerce, knows his way around in the electrical appliance business, for that is the field which normally occupies his attention. He will be the principal speaker at the annual meeting of the Electric Institute of Washington, D. C.

* * *

Eric Johnston To Speak at Annual Dinner Of Electric Institute of Washington, D. C.

WASHINGTON, D. C.—The Electric Institute of Washington, D. C., will hold its 10th annual membership meeting at the Hotel Statler, Tuesday, March 21. Principal speaker for the occasion will be Eric Johnston, president of the Chamber of Commerce of the United States.

Other speakers are: Dr. William McClellan, chairman of the board, Union Electric Co. of Missouri and member of the board of directors of Potomac Electric Power Co., Washington, D. C., whose topic is "The Electrical Industry;" Alfred G. Neal, president, Potomac Electric Power Co., on "Electric Utility Service;" J. S. Bartlett, managing director of the Institute, who will discuss "Results of Cooperative Effort." Mr. Johnston has chosen for his address, "American Business and the Peace."

On the evening's agenda, preceding the business session, will be a reception and a dinner for Institute members and their guests. George F. Kindley, vice president of Edgar Morris Sales Co., Washington, will preside at the business meeting, at which the newly elected Institute officers for the ensuing year will be installed.

Elected for the year 1944, are L. S. McCarthy, president (divisional merchandise manager, Woodward and Lothrop); N. H. Barnes, vice president (sales manager, Potomac Electric Power Co.); K. D. Boucher, secretary (sales manager, the United Clay Products Co.); N. E. Burdette, treasurer (secretary, Refrigeration Supply Co., Inc.). Mr. Kindley is the retiring president.

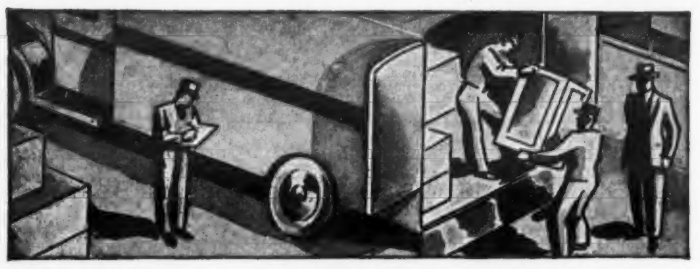
Eric Johnston is not only the most prominent and active spokesman in wartime Washington for American business men, but he is admirably versed in the language of the electrical industry, being at the head of three large electric sales and manufacturing corporations. Little known is the fact that he was born in Washington, D. C., where his father owned a pharmacy. At the age of one, the family moved to Montana and a year later to Spokane.

In 1917 he was one of six seniors at the university recommended by the school's president as officer candidate material for the Marine Corps. He was stationed for a while at Quantico as 2nd Lieutenant, later he went to Peking, China where he served as Legation Guard and from there moved up as assistant to the Naval Attache.

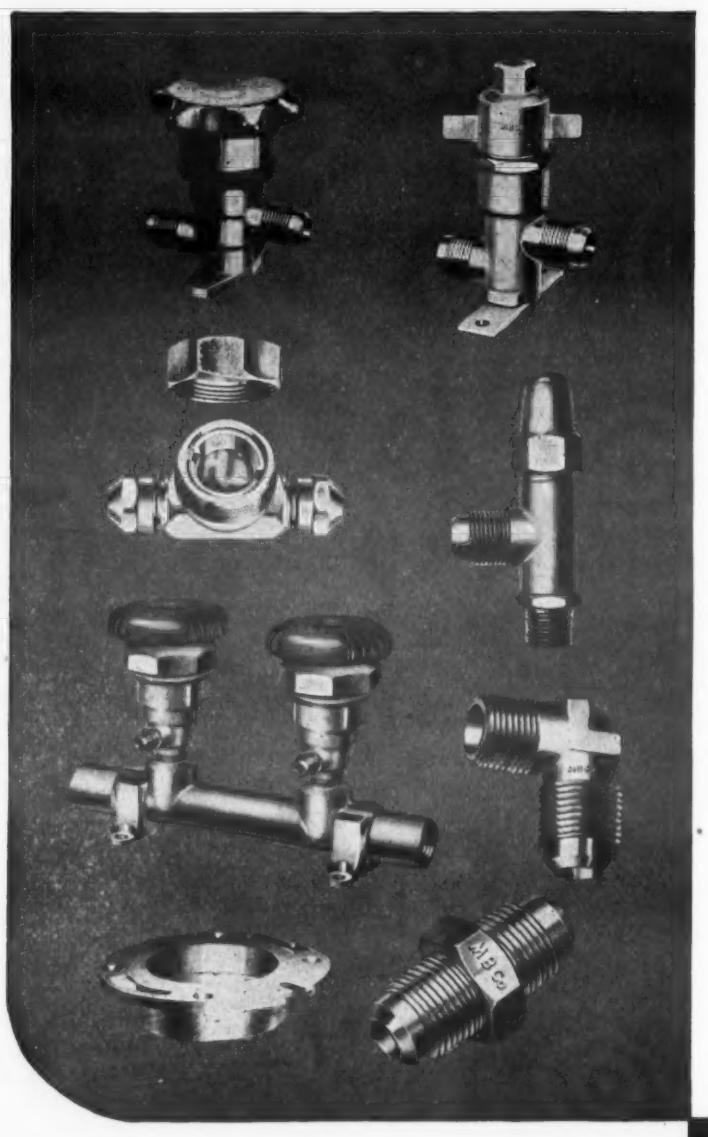
Eric Johnston's entry and rise to prominence in the electrical field reads like a Horatio Alger story. His mother had purchased $2,500 of commercial paper in a company which sold vacuum cleaners and washers. Many purchasers of these machines defaulted in their payments which resulted in the machines being taken back and he envisioned his first business opportunity.

He took a job as door-to-door salesman and although he didn't make a single sale for the first two weeks, his perseverance was unfaltering. The next week he sold four machines and success continued. By this time he had become enthusiastic over the possibilities which this new job offered, so much so that he bought an interest in the company. Later on, he borrowed money and purchased the largest electrical concern in Seattle and paid off the entire loan in a period of six years.

Today, he is president of: Brown-Johnston Co., electric appliance retailers; Wayne-Burnaby, electrical contractors who work on jobs of a million dollars each, or better; and Columbia Electric and Manufacturing Co., manufacturers.



A REPUTATION FOR SUSTAINED DELIVERY



Although war time production and restrictions have necessarily made it very difficult to produce and ship goods to our customers at a rate approximating our peace time rate, we have managed to supply our customers with their essential requirements in reasonable time.

This condition does not prevail through mere chance. When the war broke out we made an extensive study of how we could best serve our customers within existing regulations. This, together with the fact that we are not dependent upon outside sources, but manufacture and control all the parts and operations of our products from the virgin metal to the finished goods, is largely responsible for our favorable position today. WE HAVE A REPUTATION FOR SUSTAINED DELIVERY.

Mueller Brass Co. refrigeration products are in use with our armed forces on practically every front. They are incorporated in units produced by other manufacturers who depend upon us for prompt service and quality products.

Service engineers can place full confidence in Mueller Brass Co. Valves and Fittings. Rigid laboratory control, skilled engineering, highest quality materials, precision workmanship and rigid inspection combine to make our products constantly dependable.

VALVES • FITTINGS • ACCESSORIES FOR REFRIGERATION AND AIR CONDITIONING

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AVAILABLE NOW TO BUYERS WITH PRIORITY . . . in any size or type. Amana's long experience in building "Walk In" Coolers is assurance of efficiency and long service. Insulation of latest models is of corkboard or "Fiberglas" insuring extra economy and top cooling ability.

REFRIGERATION DIVISION
AMANA SOCIETY
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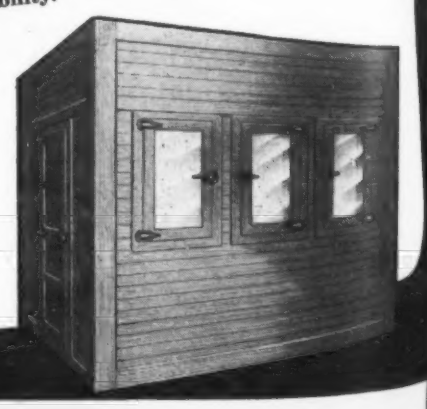
ARMY E NAVY

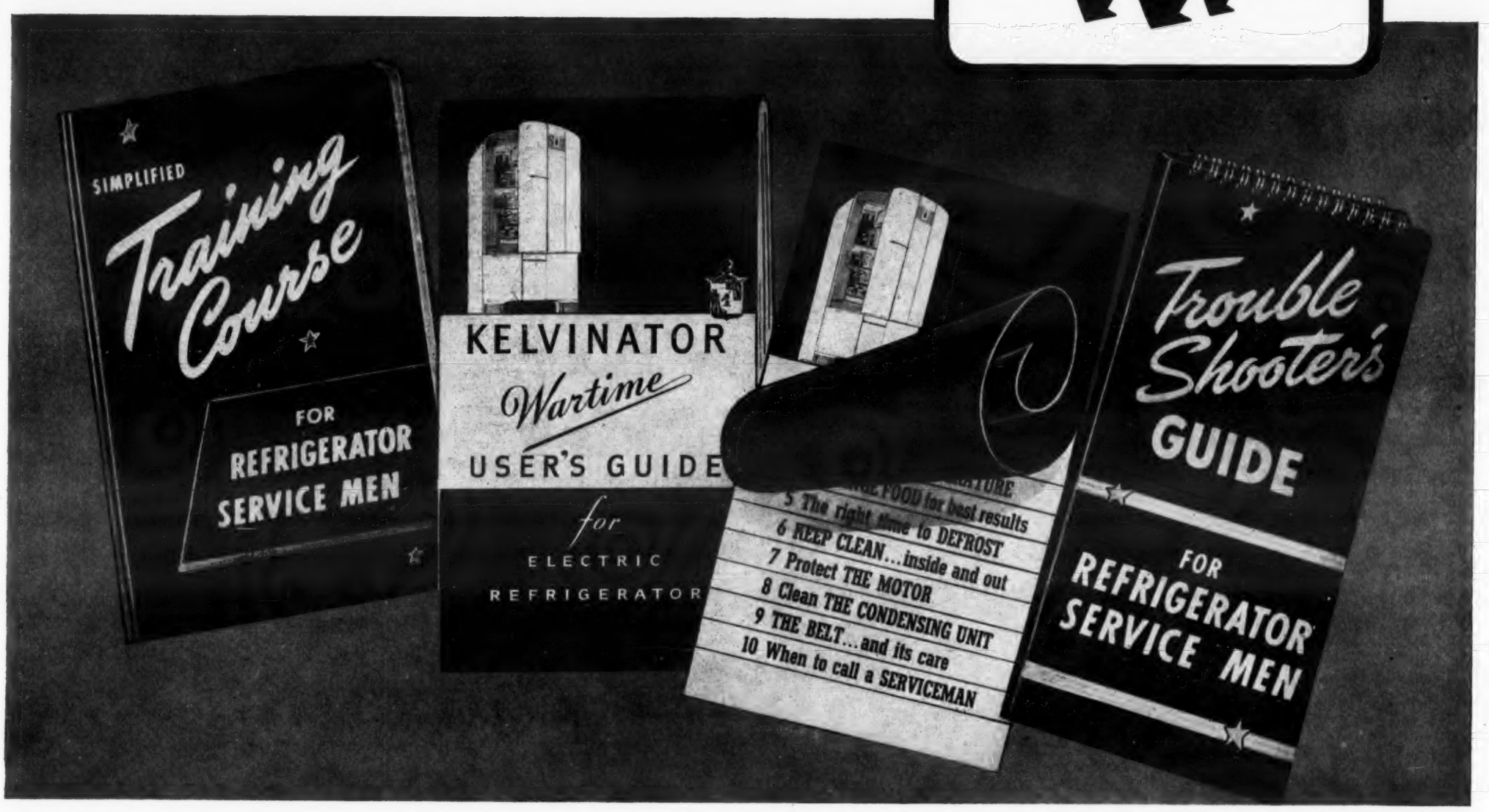
Awarded the Army-Navy "E" with White Star for continuance of excellence in production of war materials.



PREPARE NOW FOR SUMMER SERVICE

BETTER CARE — Electric Refrigeration — LESS REPAIR

Kelvinator's Popular Service Training Program Again Made Available to the Entire Industry.



In the coming third summer of war, servicing electrical appliances will be a bigger problem than ever.

Recognizing the importance of this problem . . . and in cooperation with the National Appliance Conservation Program . . . Kelvinator offers to the industry its three-point wartime refrigerator service program. Retailers called it the most valuable help of the year in meeting service problems of 1943.

First—The "Simplified Training Course for Refrigerator Service Men"—a complete 236-page book for quickly training men or women in the fundamentals of servicing any make refrigerator. Thousands of copies of this training course have been used by retailers, utilities and technical schools in training new people. With this is an "Instruction Manual" for use in group training.

Second—The "Trouble Shooter's Guide"—a ready reference on the cause and correction of common customer complaints. With this, most operating troubles . . . regardless of make of refrigerator . . . can be quickly diagnosed and corrected. Especially prepared for new or inexperienced service men, it proved last year to be extremely helpful also to old-timers.

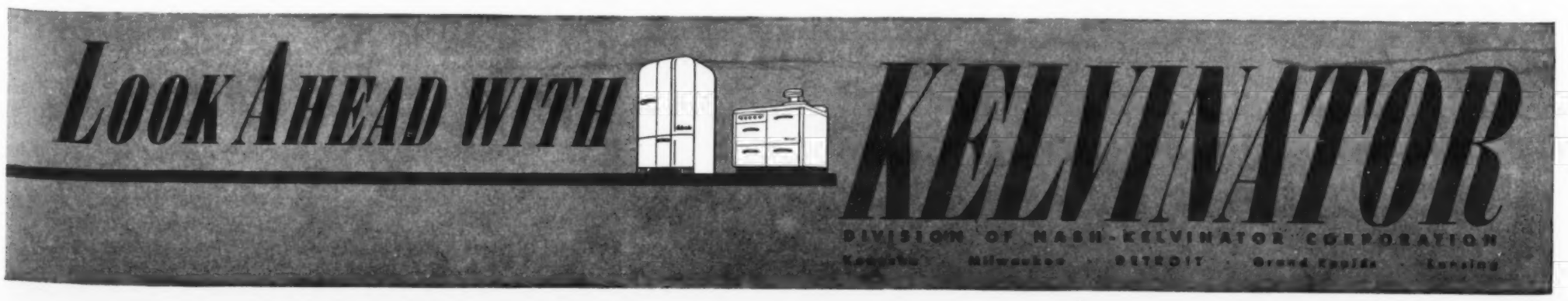
Third—The "Refrigerator User's Guide"—A completely new trouble shooter's guide for home use, it tells what must be done to keep a refrigerator operating efficiently—how the user can diagnose minor troubles and make proper adjustments and repairs at home until a trained serviceman is available.

This material is made available by Kelvinator to all those in the industry that provide service to refrigerator users, in a sincere effort to make a worthwhile contribution to the solving of a most vital wartime problem.

To control distribution, a nominal 25¢ charge is made for the 236-page "Training Course" and a 5¢ charge is made for the "Trouble Shooter's Guide." The "User's Guide" is available at no cost in conservative quantities to recognized refrigerator retailers and service organizations.

Your Kelvinator representative will be glad to help you plan a complete and workable service program around this practical material. For complete information, contact your local Kelvinator Distributor or Zone Office.

The men and women of the Propeller Division of Nash-Kelvinator Corporation have been awarded, and proudly fly and wear, the famous Army-Navy "E" for High Achievement in War Production.

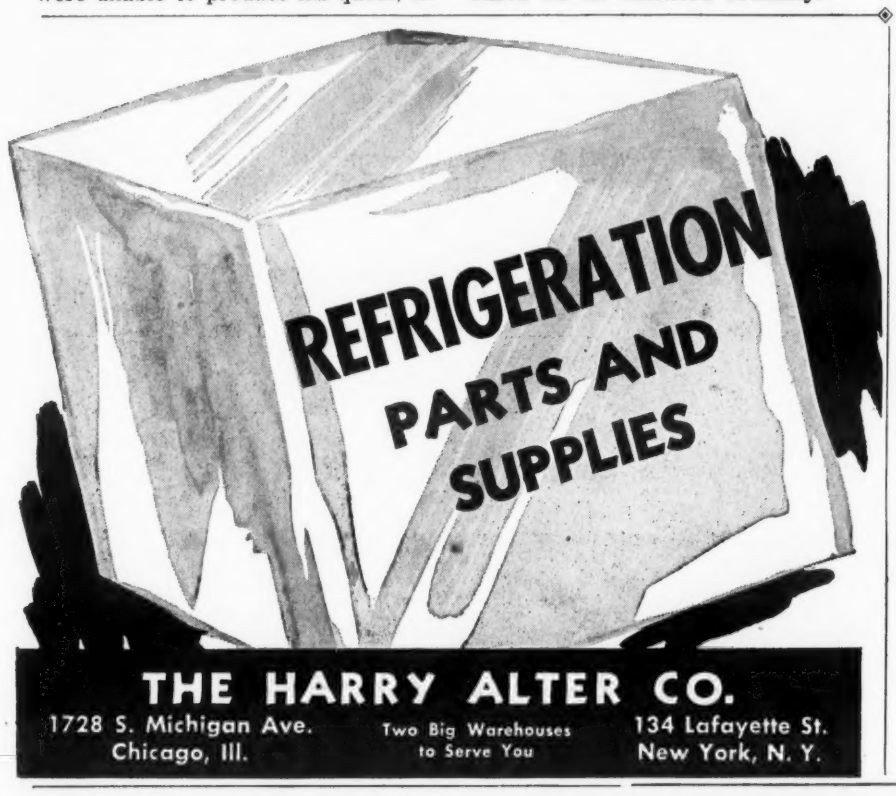


'Base Year' Quotas For Civilian Production Favored By Some, But Others Find Objections

(Concluded from Page 1, Column 3)

"Journal," "because it would prolong the time before civilian goods are made in needed quantities. According to this plan, each plant would be restricted to the production rate at which it was operating during the base production year, in most cases 1941. If a manufacturer were unable to produce his quota, he would continue to save it up until his facilities would permit.

"Some industrial leaders, including former Civilian Requirements Chief Arthur D. Whiteside, are heartily in favor of a solution of this sort. Others, however, contend it would mean an effort to get a highly increased national economy on quotas based on an outdated economy."



THE HARRY ALTER CO.
1728 S. Michigan Ave. Chicago, Ill.
Two Big Warehouses to Serve You
134 Lafayette St. New York, N. Y.

No Single 'X-Day' Is Dinegar's Viewpoint

(Concluded from Page 1, Column 2)

cause many differing types of reconversion plans are under the careful scrutiny of policy making officials of the board. Until a definite decision is made on exact steps to be followed in a changeover from a war to a peacetime economy, none of us is in a position to speak too specifically."

Commenting on the Baruch report's warning that preparations must be made for an "X-day," Dinegar said he believed "there is no such thing as a single X-day." For some companies, he explained, "that day has already arrived while for others it will before peace in Europe."

"Our planning, therefore," he added, "must take account of the fact that reconversion of many individual companies will have to be solved at least in part well before the German armistice."

Whiteside Advocates 4-Point Conversion Plan

(Concluded from Page 1, Column 4)

1. Return of plants to civilian production on a quota basis, until most of them are reconverted. This should take two or three years.

2. Rescheduling of price controls to permit concerns to live, but probably not the 25% mark-up sought.

3. A position in the reconversion schedule for new producers.

4. Control of distribution to prevent inequities of supply.

Many Areas Start Service Training

(Concluded from Page 1, Column 5)

lin, Mo., Kansas City, Mo., Louisiana, Mo., Rolla, Mo., St. Joseph, Mo., St. Louis, Mo., Glendive, Mont., Omaha, Neb., Manchester, N. H., Portsmouth, N. H., Asbury Park, N. J., Newark, N. J., Santa Fe, N. M., Lockport, N. Y., Middletown, N. Y.

New York, N. Y., Nyack, N. Y., Rochester, N. Y., Rome, N. Y., Raleigh, N. C., Columbus, Ohio, Findlay, Ohio, Mansfield, Ohio, Toledo, Ohio, Youngstown, Ohio, Oklahoma City, Okla., Tulsa, Okla.

Kingston, Pa., Pittsburgh, Pa., Reading, Pa., Towanda, Pa., Charleston, S. C., Huron, S. Dak., Bristol, Tenn.

Beaumont, Texas, Dallas, Texas, Houston, Texas, Richfield, Utah, Salt Lake City, Utah, Alexandria, Va.

Washington, D. C., Fairmont, W. Va., Appleton, Wis., Madison, Wis., Milwaukee, Wis., Oshkosh, Wis., Superior, Wis.

2. Local Councils have been reported formed in the following cities:

Anniston, Ala., Birmingham, Ala., Phoenix, Ariz., Los Angeles, Calif., Denver, Colo., Hartford, Conn., New Britain, Conn., Wichita, Kan.

Monroe, La., New Orleans, La., Minneapolis, Minn., Lebanon, Mo., Newark, N. J., Santa Fe, N. M., Lockport, N. Y., Rochester, N. Y.

Rome, N. Y., Columbus, Ohio, Cleveland, Ohio, Oklahoma City, Okla., Reading, Pa., Dallas, Texas. Houston, Texas, Salt Lake City, Utah, Madison, Wis.

Procurement and Training Committees have arranged for trainees with USES and other sources, have arranged for classes with the U. S. Department of Education, and have started their courses as prescribed in the following cities:

Anniston, Ala., Birmingham, Ala., Denver, Colo., Hartford, Conn., Wichita, Kan., New Orleans, La., Detroit, Mich.

Minneapolis, Minn., Lebanon, Mo., St. Louis, Mo., Santa Fe, N. M., Lockport, N. Y., Cleveland, Ohio, Youngstown, Ohio.

Reading, Pa., Salt Lake City, Utah, Provo, Utah, Price, Utah, Ogden, Utah, Logan, Utah, Washington, D. C., Madison, Wis.

We are receiving at the present time an average of two letters per day advising us of the formation of either a new local council, or actual beginning of class instruction and hiring of trainees. In five cities in Utah we were notified on Feb. 24, that 140 students were being trained in the first section, and that another section was under way.

From the reports it is evident in many cases that the training course is under way before this office has been advised that a local council has been formed. Several vocational schools such as West Tech. in Cleveland, Ohio, several YMCA schools, and others have requested our permission to use our course outline. There are 147 students enrolled in West Tech. alone. The Refrigeration Institute at Youngstown, Ohio, and the David Ranken, Jr., School at St. Louis, and several others are cooperating with the local councils.

Program Announced For Toronto March 19-20

(Concluded from Page 1, Column 4)

Presentation of Interprovincial Charter.

Appointment of Nominating Committee.

Lunch period.

SUNDAY AFTERNOON, MARCH 19

"Home Freezers." (Speaker to be announced).

"Man Power Training Program," Warren W. Farr, Cleveland.

"The Future of the Service Engineer," G. E. Graff, Ranco, Inc.

"Refrigeration in North Africa" by Irving Wilson, Superior Valves and Fittings Co.

"The Serviceman's Place in the Refrigeration Industry" by W. C. Kennedy, Frigidaire Products of Canada Ltd.

MONDAY MORNING, MARCH 20

"Low Temperature Valves" by F. Y. Carter, Detroit Lubricator Co.

"Sub-zero Refrigeration," Carl Olin, Servel, Inc.

Treasurer's report.

Secretary's report.

Election of officers.

Lunch hour.

MONDAY AFTERNOON, MARCH 20

"Refrigerants," N. C. Cooper, Electrochemicals Dept., Dupont.

"Hermetic Units," by C. M. Brown, Tecumseh Products Co.

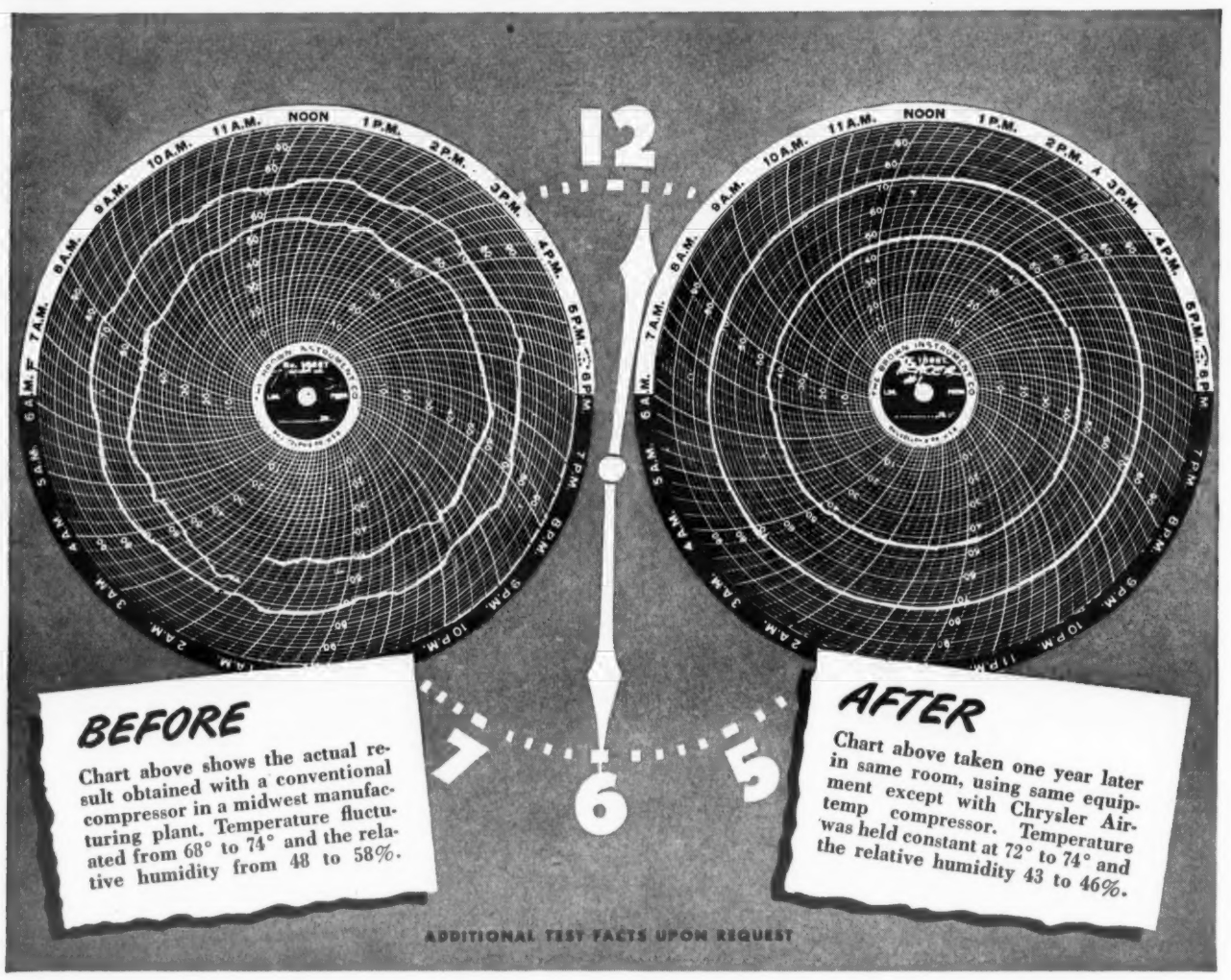
"Bookkeeping for Servicemen," Ramsay Bookkeeping System.

"Dryers and Strainers," George Wilson, Henry Valve Co.

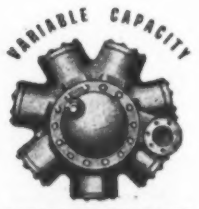
"Information Please" by Board of Experts, Harry Parish, M.C.

MONDAY EVENING, MARCH 20

7 p.m. Banquet and dance.


12
7
6
5
BEFORE
Chart above shows the actual result obtained with a conventional compressor in a midwest manufacturing plant. Temperature fluctuated from 68° to 74° and the relative humidity from 48 to 58%.
AFTER
Chart above taken one year later in same room, using same equipment except with Chrysler Airtemp compressor. Temperature was held constant at 72° to 74° and the relative humidity 43 to 46%.
ADDITIONAL TEST FACTS UPON REQUEST

"Pin Point" Accuracy in 'Round the Clock Air Control ... Due to Variable Capacity



RADIAL COMPRESSOR

The "before" and "after" charts are convincing evidence, positive proof of Chrysler Airtemp *Variable Capacity* Radial Compressor superiority.

The exclusive *Variable Capacity* feature of this famous unit brings a new, precise science to temperature-humidity control and to commercial refrigeration.

Individual cylinders of the smooth-running Radial Compressor automatically cut in or out, one at a time, to meet varying load requirements.

This flexibility eliminates the peaks and valleys resulting from frequent starting and stopping of ordinary compressors—assuring accurate control.

Features *Automatic Variable Capacity Control • Unloaded Starting • Direct Connected • Simplified Installation • Non-Flexing Valves • Practically No Vibration • Interchangeable Parts • No Special Foundations Needed • Light in Weight*

BUY WAR BONDS

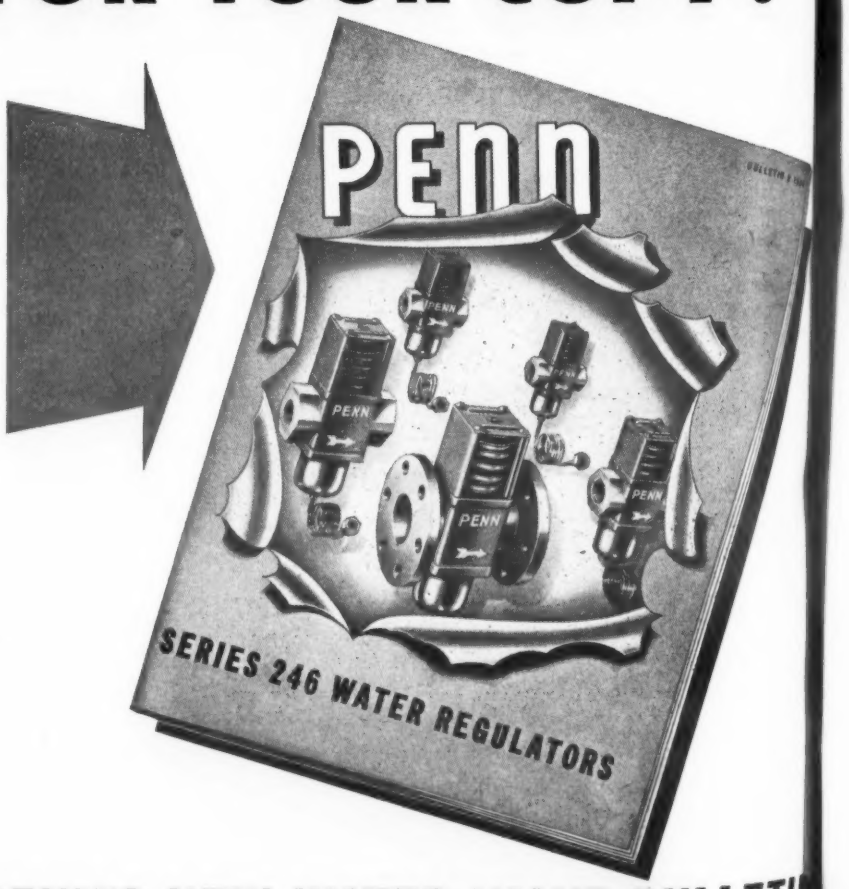
CHRYSLER AIRTEMP

AIRTEMP DIVISION OF CHRYSLER CORPORATION • DAYTON, OHIO

"Packaged" Units 3 & 5 H. P.—Direct Expansion and Water Cooling Systems—Commercial Refrigeration

Tune in Major Bowes every Thursday, C. B. S., 9 p. m., E. W. T.

HAVE YOU SENT FOR YOUR COPY?



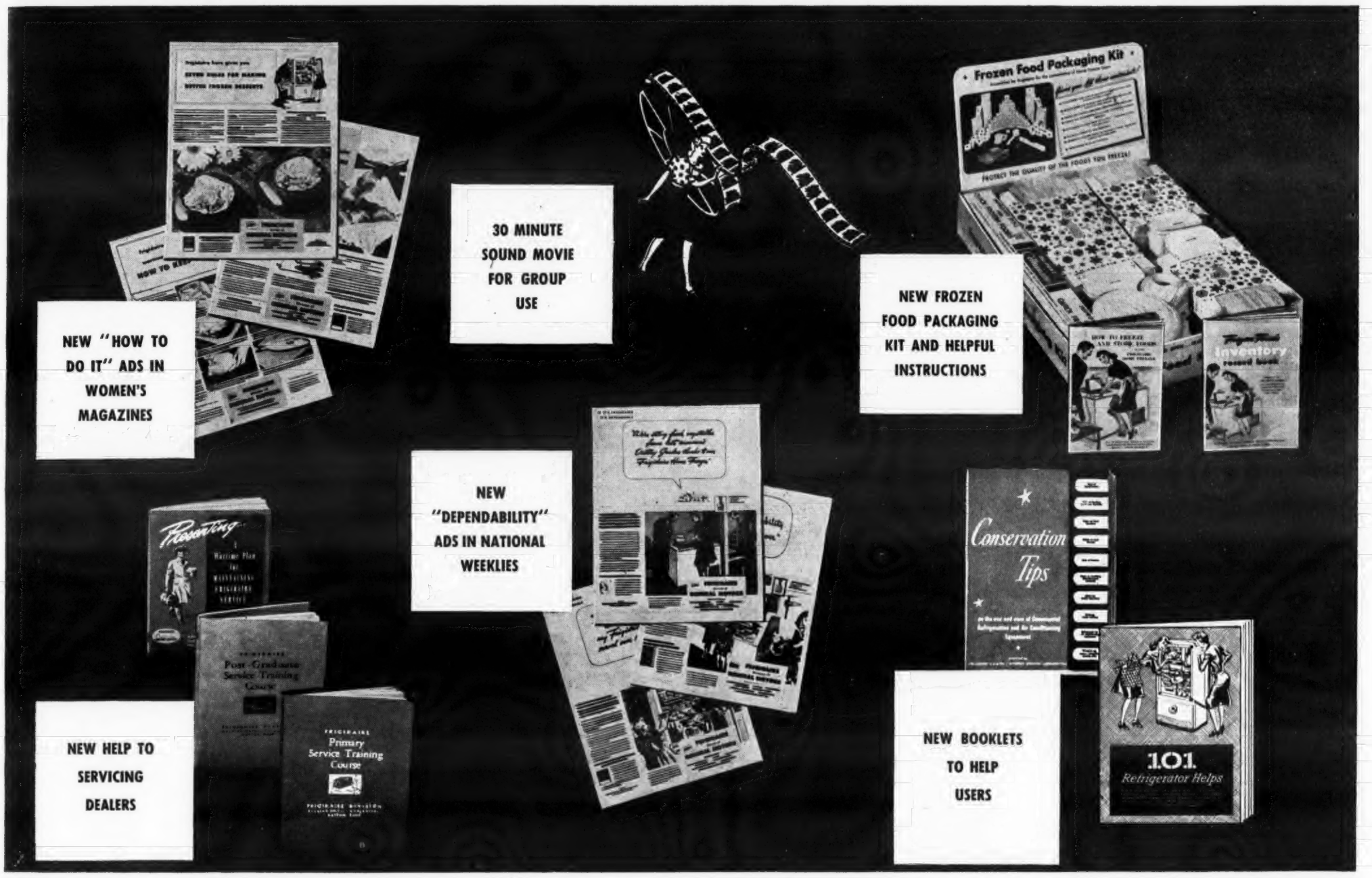
PENN'S NEW WATER VALVE BULLETI

illustrates and describes the new . . *revolutionary* . . features of th Series 246 regulators. Inherently different in design, these ne Valves introduce new efficiency, dependability, and performan in water regulation for all refrigeration applications. Your po war valve is here *now!* No obligation; write for *Bulletin no*

PENN ELECTRIC SWITCH CO., GOSHEN, IN

FRIGIDAIRE'S
New Enlarged Dealer Program for 1944

- **TO HELP BUILD GOOD WILL WITH FUTURE PROSPECTS**
- **TO HELP DEALERS MAINTAIN THEIR FRIGIDAIRE IDENTITY**
- **TO HELP KEEP AMERICA'S ESSENTIAL REFRIGERATION EQUIPMENT IN OPERATION**


NEW "HOW TO DO IT" ADS IN WOMEN'S MAGAZINES
30 MINUTE SOUND MOVIE FOR GROUP USE
NEW FROZEN FOOD PACKAGING KIT AND HELPFUL INSTRUCTIONS
NEW "DEPENDABILITY" ADS IN NATIONAL WEEKLIES
NEW HELP TO SERVICING DEALERS
NEW BOOKLETS TO HELP USERS
Frozen Food Packaging Kit
Inventory record book
Conservation Tips
Post-Graduate Service Training Course
Primary Service Training Course
101 Refrigerator Helps

New Attention-Getting Advertising

Frigidaire's 1944 advertising is addressed to the millions of post-war prospects for electric refrigerators, ranges, water heaters, commercial refrigeration and air conditioning equipment.

Extensive use will be made of leading monthly and weekly magazines, newspaper supplements, key city newspapers; farm and business publications!

Interesting, colorful advertisements will emphasize Frigidaire's wartime service . . . help Frigidaire dealers build for additional post-war leadership in all markets!

Continuing last year's successful campaign, a new series of "down-to-earth" Frigidaire messages in women's magazines will offer refrigerator users timely, practical help with wartime food and refrigeration problems.

In a long list of national weekly publications the dependability of Frigidaire products will be stressed, to register with readers that the name "Frigidaire" on a refrigerator, range, home freezer or on commercial or air conditioning equipment, is a dependable guarantee of user satisfaction.

New Aid Offered Teachers and Group Leaders

In their own professional publications Frigidaire will again provide home economists, teachers and group leaders with specialized information on timely refrigeration subjects for use with classes and study groups. Helpful, informative booklets will be offered free for distribution to students and members. And the popular General Motors sound movie "How to Get the Most Out of Your Refrigerator" will be made available for thousands more group showings.

New Booklets for Dealer Use

Last year more than 6¼ million copies of Wartime Suggestions were distributed—more than 5¾ million copies by Frigidaire dealers! This year they will have two new booklets on a free of charge basis to help them maintain contacts with potential Frigidaire customers and to capitalize on national advertising!

A new and improved refrigerator booklet, a companion to Wartime Suggestions, will contain new, more detailed information on refrigerator care and use that will be welcomed by all refrigerator users.

Another new booklet will help users of commercial refrigeration and air conditioning equipment solve *their* wartime problems and enable Frigidaire dealers to keep in touch with potential prospects in these important fields.

New Home Freezer Materials

Frigidaire is well aware of the post-war opportunities of the Home Freezer market and is doing something about them *now*. Knowing that the wrapping of food often determines success or failure of home freezing, Frigidaire has created a new Frozen Food Packaging kit of approved wrapping materials to be distributed through Frigidaire dealers. This kit will do two things—provide an important service to Frigidaire Home Freezer users and help the Frigidaire dealer identify himself with the Home Freezer business in his community.

Included with the kit are complete packaging instructions and a helpful Inventory Record Book that can be used as an "in and out" record of Home Freezer contents . . . when foods were stored, where they are located, how much remains.

In addition to these materials Frigidaire's recently released Home Freezer booklet gives Frigidaire users complete instructions on the preparation, wrapping and storage of foods for home freezing.

New Help For the Servicing Dealer

Refrigeration service was never more important, the problems never greater. Frigidaire's comprehensive plan to aid dealers is based on greatly expanded factory facilities for parts manufacture and parts distribution as well as help with vital manpower problems. There are unique, practical training materials for the beginner, "post-graduate" courses for the veteran. A "preventive service" program helps to level service peaks and to make fullest use of available manpower.

New Opportunities for the Future

Frigidaire's entire 1944 program is designed to build good will for Frigidaire products and the Frigidaire Dealer. This it will do by offering real help to household refrigerator, commercial equipment and home freezer users *now*. And it will do something more. It will build a backlog of sales opportunities for all Frigidaire products that will benefit every Frigidaire Dealer when peacetime selling activities are resumed.

To continue to make Frigidaire products America's first choice is our goal for the future. Our plans must await Victory. But one thing is certain: *there will be more and better Frigidaire products for more people and, in their making and selling, more jobs for more men.*

For Excellence ARMY (E) NAVY *in War Production*

FRIGIDAIRE
Division of
GENERAL MOTORS
DAYTON 1, OHIO • LEASIDE, ONTARIO
Peacetime builders of
ELECTRIC REFRIGERATORS • RANGES • WATER HEATERS
HOME FREEZERS • ICE CREAM CABINETS
COMMERCIAL REFRIGERATION • AIR CONDITIONERS
BEVERAGE, MILK, AND WATER COOLERS

Listen to
GENERAL MOTORS SYMPHONY OF THE AIR
Every Sunday Afternoon, NBC Network

You Think You Have Troubles? Just Get a Load of This—

Service Man Makes 100-Yard Dash On 'Commando' Course For Calls

By C. Dale Mericle

HAYWARD, Calif.—"Hey, McNew, got a call for you," yells McNew's pyjama-clad ex-friend and next-door neighbor into the black of night.

"Coming!" Repairman NcNew's reply drifts back through the darkness as he quickly but carefully lays down his wrench in the chicken coop that houses his refrigeration service shop.

Once again McNew starts his 100-yard dash over a "Commando" obstacle course, racing through or over two gates, into the house via three doors, and slumping into a chair as he weakly grabs at the phone.

"Hello," he puffs.

"Look, our meat case is getting warm. No refrigeration. Can you come right over," anxiously pleads Butcher Joe Schmidt.

"Sure thing," gasps McNew, who waits to catch another breath before retracing his hurried steps to the chicken coop.

That's the way V. L. McNew, refrigeration service engineer had been forced to operate his vital business for several months. He couldn't get a telephone installed.

It all started when McNew opened up his own service shop.

Immediately after Pearl Harbor, McNew had volunteered for the Army Transport Service as a refrigeration engineer. He made three trips and was then placed on the inactive list. So he went back to servicing civilian refrigerators.

With local dealers' blessing, McNew decided to go in business for himself. The ingenious Mr. McNew bought some property "improved" with chicken coops located next door to the home of a friend. Remodeled, the chicken coops served as living quarters and workshop.

Everything was fine until he tried to have a phone installed to accept service calls. The telephone company said, "Sorry, but . . ." It seems his need for a phone was not recognized by local pooh-bahs of the telephone company and the WPB.

Using the neighbor's phone proved a partial solution to the problem. When the neighbors were home—fine.

But the neighbors weren't home during the day, and "several butchers lost considerable meat because they could not reach me at times when no one was home next door," complained McNew.

Finally McNew appealed to AIR CONDITIONING & REFRIGERATION NEWS for assistance. The NEWS staff first attempted to locate a former representative of a refrigerator manufacturer believed to be a field man for the WPB in the San Francisco area. No soap.

The editor of the NEWS then talked to Sterling F. Smith, chief of the Refrigeration and Air Conditioning Section of WPB headquarters in Washington, D. C., explaining McNew's predicament.

McNew got the phone — two of them in fact—one in the service shop and one in the residence.

Here's the complete story:

McNew Complains

Blossom Way Refrigeration Service
876 Blossom Way,
Hayward, Calif.

Editor:

Am writing you to see if you can give me any information in regards to getting a telephone.

Shortly after war broke out I signed up with the Army Transport Service in San Francisco for service on a transport. I made three trips but it seems they have more refrigeration engineers than they need so went to work here in Hayward last spring for the Frigidaire dealer. I am still on call for the Army Transport Service, but do not expect to ever be called again.

The dealer I went to work for here did not have enough refrigeration work to keep me busy so we talked it over and decided it would be to our mutual benefit for me to open a shop of my own. I purchased a place here with some chicken houses on the property which I was able to make over into a shop and place to live.

The property was next door to the place we had been living in with some friends of ours. We had a residence phone in this house.

We applied to the telephone company for a telephone and were turned down as you can see from the enclosed letter. At the present time we use the phone next door but as no one is home there during the day we miss most of the calls.

At the present time I am doing the refrigeration work for the Frigidaire dealer here, also the Kelvinator dealer here and Kelvinator dealer in Irvington, the Army Post here, the Union Ice Company Vendors in this territory besides a number of markets, butchers, restaurants and ice cream parlors. Several butchers have lost considerable meat because they could not reach me at times when no one was home next door.

These people have been friends of ours for years and they leave their house open for us during the day so we can get to the phone and a gong has been installed so we can hear it. This is a big help but when it rings we have to go through a couple of gates and three doors besides make a hundred yard dash. The result is if the party calling doesn't know the setup we have the trip for nothing. I lose about two hours a day doing this.

We have plenty of work regardless of this handicap although most of the calls come in after 5 p.m. and I have to work mostly at night on emergency calls. Our friends are fast becoming enemies over being called out of bed at night and having us bust in on them at all times to phone.

I am as patriotic as the next guy and do not want to do anything to impair the war effort. However, it seems to me this phone is important. The telephone company says it is not listed with them as an essential service.

V. L. McNew

P.S. We tried to get the residence phone moved but were turned down on that also.

Phone Co. Is Sorry

The Pacific Telephone & Telegraph Co.
Hayward, Calif.

Dear Mr. McNew:

With reference to your application for telephone service, we regret to advise that your appeal has been denied by the War Production Board.

In order to provide you with service it would be necessary for us to use materials which are required to fight the war. As you have no doubt heard, restrictions have been placed on this material and it is not now available.

W. B. Sutherland, Manager.

Sterling Smith Reports

War Production Board
Washington, D. C.

Dear George:

Sorry you had to remind me to let you know about Mr. E. M. McNew and the Blossom Way Refrigeration Service of Hayward, Calif., but I am glad to be able at this time to tell you that Mr. McNew is happy for the present and on the way to a full solution of his telephone troubles.

When your letter arrived I asked Rod Tait to check into the situation and he promptly communicated with Field Service, they in turn got to work with the San Francisco office of the War Production Board who checked back with the Pacific Telephone and Telegraph Co.

The net of the whole thing is that Mr. McNew has moved into a new home, has a telephone which serves the purpose inasmuch as his wife now takes the calls and a phone is being installed in his place of business. Undoubtedly it is in there by now so everything is under control.

Sterling Smith

At Long Last

Blossom Way Refrigeration Service
Hayward, Calif.

Editor:

Several months ago I wrote you asking your advice on getting telephone service as we had been turned down by the telephone company here for the duration. You wrote me later that you would do what you could about it.

A couple of months later the telephone company moved a residence phone in for us and now have put in a business phone. This must have been done because of your efforts as we did not get anywhere here ourselves. We are surely grateful and will always be indebted to you for this extra service. Please count on us as lifetime subscribers. I can only find one fault with the NEWS and that is the fact that I do not get any work done on the day it arrives.

V. L. McNew

through All-Purpose Engineering...

Universal Cooler's New Refrigerating Units Answer All Your Needs in Post-War Hermetics

If, today, you are planning in terms of a refrigerating unit that is functionally right for your needs tomorrow, investigate this fact:

New low, compact, Universal Cooler Hermetics ready for release after Victory comprise a complete line of basic, field-tested models . . . ALL-PURPOSE ENGINEERED* for simplified, efficient adaptation to your requirements.

Add performance, the outstanding Universal Cooler performance being proved every day in world-wide military service, and you will see why leading fixture manufacturers say...

ALL-PURPOSE ENGINEERING is the art of making a thing in simplest form for the widest possible range of applications and/or conditions.

EXAMPLE: For shipping Army and Navy supplies to the corners of the earth, a corrugated shipping box has been engineered to package everything from butter to bombs! With a bursting test of 400 pounds per square inch, this remarkable shipping carton is weather-proof, resistant to salt water and air, corrosion and insect infestation. That's *ALL-Purpose Engineering!*

In refrigeration, Universal Cooler leads the field in applying All-Purpose Engineering.

"Let's Ask Universal Cooler"

UNIVERSAL COOLER

WE SELL TO MANUFACTURERS ONLY

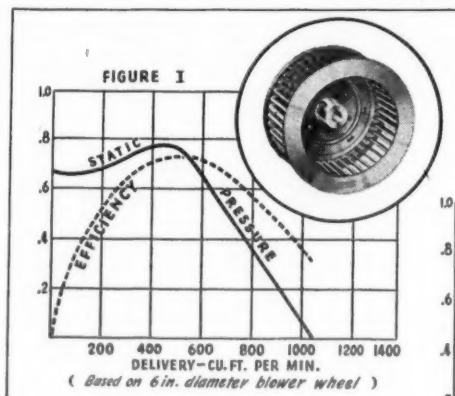
UNIVERSAL COOLER CORPORATION • Automatic Refrigeration since 1922

MARION, OHIO • BRANTFORD, ONTARIO

Tips for Designing Air Impelling Units

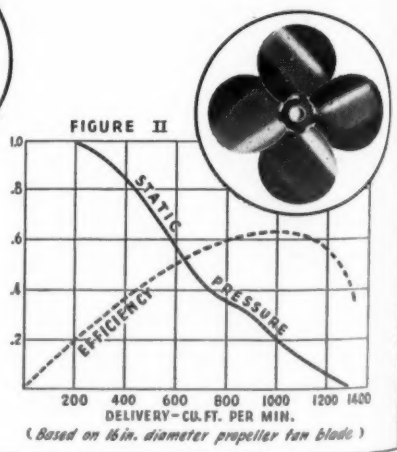
No. 6 of a series

FIGURE I



(*Based on 6 in. diameter blower wheel*)

FIGURE II



(*Based on 18 in. diameter propeller fan blade*)

Blower Wheel vs. Propeller Fan

As shown by the representative performance curves in Figs. I and II, properly designed blower wheels operate at maximum efficiency when near their maximum static pressure, while propeller fans are most efficient when moving large volumes of air at low pressure.

In general, these characteristics determine whether to use a blower wheel or a propeller fan type of air impeller, but, frequently service conditions make it desirable to adopt a blower wheel for low pressure or a propeller fan for high pressure.

Choice of the correct type of air impeller is but one of a number of important factors in designing a unit in which the function of the air impeller is important.

Consultation with Torrington's Research Laboratory, preferably during the early stages of the design of products using air impellers, may prevent costly changes and production delays. Phone or write for appointment.

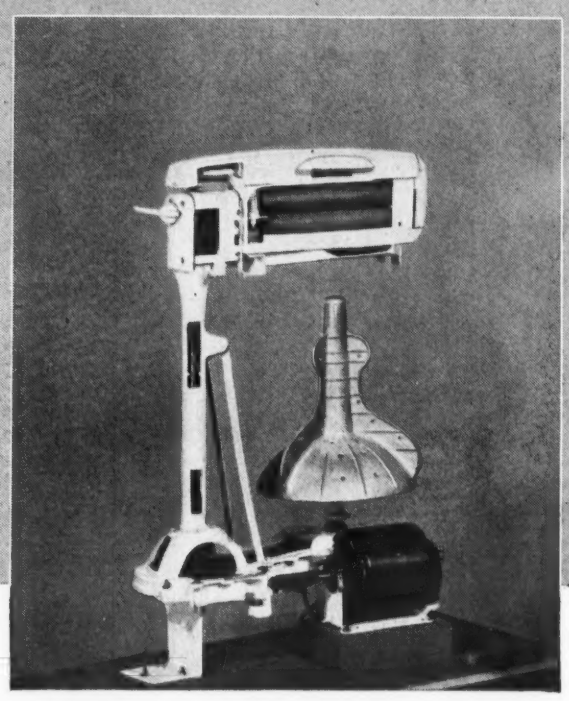
THE TORRINGTON MANUFACTURING CO. TORRINGTON, CONN.

Manufacturers of AIRistocrat Quiet Propeller Fan Blades & AIRotor Blower Wheels

A *Quick, thorough course of* EXPERT TRAINING

WAIT'LL YOU SEE THE NEW DEMONSTRATION BOARDS

Right out where you can see them on big boards and wired for operation are all the vital parts of Westinghouse major appliances—refrigerators, ranges, and laundry equipment. All sorts of service problems can be set up for the student to study and learn how to solve. Men attending the class diagnose troubles and correct them right on the demonstration boards.

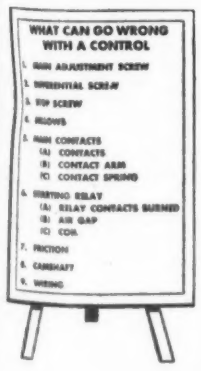


THESE CUT-AWAY PRODUCTS SHOW WHAT MAKES THE WHEELS GO 'ROUND

What goes on inside a Westinghouse washer, iron, etc., is clearly demonstrated by these stripped-down models.

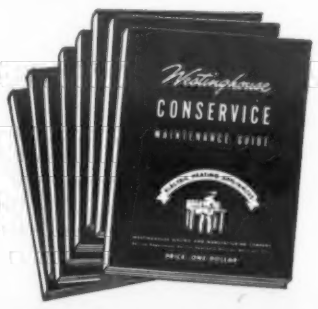
EVERYTHING IS FURTHER EXPLAINED WITH DRAMATIC SLIDE FILMS

A series of six films supplements the instruction of the demonstration boards and diagnosis charts. One film is designed especially to improve the serviceman's morale by stressing the importance of his job, and showing him how to conduct himself in various situations.



FIVE SETS OF DIAGNOSIS CHARTS SPEED UP TROUBLE SHOOTING

With these charts the instructor leads the class through a detailed analysis of the causes of various service complaints. They help the serviceman to spot trouble quickly, thus saving his time and increasing his daily output.



AND TO BUTTON EVERYTHING UP THERE ARE THREE NEW CONSERVICE GUIDES

The "how-to-fix-it" books produced last year have been the talk of the trade. Three new Conservice Guides have now been added, making eight in all—with a value of $7.50. Servicemen attending schools get a free guide for every appliance covered in classes they attend.

Here's What the 1944 Conservice Schools Offer Your New and Old Service People

With the service situation more critical than ever, you need quick action both to handle the load and fulfill the aims of the National Appliance Conservation Program.

The 1944 Conservice Schools are exactly tailored to fit these requirements.

THEY'RE QUICK—packing a course of service instruction into 16 hours.

THEY'RE THOROUGH—using actual working parts to explain the operation, maintenance and repair of all Westinghouse appliances.

THEY'RE DRAMATIC—keeping interest sustained every second with action demonstrations, lively films, discussion and informative quiz tests.

Your service people, new and old, are free to take all or any part of the course. They'll come away from the school better trained for the job and with a keener appreciation of the vital part they're playing on the home front.

Your Westinghouse Appliance Distributor will let you know on which dates schools will be held in your territory.

BETTER CARE — LESS REPAIR

NATIONAL APPLIANCE CONSERVATION PROGRAM

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

ELECTRIC HOME APPLIANCES

TUNE IN *on John Charles Thomas, NBC, Sunday, at 2:30 P.M., E.W.T. Also hear the new Westinghouse radio program on Blue Network every Monday, Wednesday and Friday at 10:15 P.M., E.W.T.*

Jobbers Open Meetings With Manufacturers; More Details Given on Problems Involved

Large Turnout at Detroit Develops Tentative Definition of an 'Assembly Manufacturer'

DETROIT—More than 50 persons were in attendance March 1 at the Ft. Shelby hotel here at the first of the district meetings arranged by the Manufacturers Relations Committee of the National Refrigeration Supply Jobbers Assn. to tackle a series of special tasks set up by the national committee.

J. M. Oberc of J. M. Oberc, Inc. was in charge of the Detroit meeting which drew parts and supply jobbers and manufacturers from parts of the Michigan, Indiana, and Ohio areas.

H. W. Small, the Thermal Co., St. Paul, chairman of the national committee, and Fred B. Hovey, executive secretary of the N.R.S.J.A., were present at the Detroit group session.

Stating that the idea of the group meetings was to give to "all those with constructive ideas on industry distribution problems an opportunity to expand on them," Mr. Small said that the three broad objectives hoped for were:

1. Eliminate any causes of friction between jobbers and manufacturers.
2. Lower jobbers' costs.
3. Lower manufacturers' costs.

Mr. Small outlined the tasks to be studied by district groups other than Detroit. In each case after the groups have had their discussions they will submit their findings to the national committee, which will then make a report and possibly some recommendations.

Task No. 2 is to devise a method of packaging and storing gaskets in such a manner that they may be more easily dispensed, selected, inventoried, and re-ordered. Mr. Small showed some examples which revealed how present packaging and marking methods made it difficult for the jobber to handle gaskets quickly or easily, or to inventory them properly.

In Task No. 3, which is "to improve the packaging and labeling of all products so that they may be stocked more easily, in less space, and may be easier to re-ship," Mr. Small is asking that manufacturers give serious consideration to improved packaging and labeling procedure on all products.

He used examples of some present-day products to demonstrate that many packages can be reduced in size, and he also showed why packages should be designed to fit in neat groups in the standard steel shelving section which measures 36 inches high by 12 inches wide and 12 inches deep.

Also recommended was a practice of putting numbers or identification symbols on the ends as well as the side of packages. Copper tubing is an item that presents some difficult packaging problems for the jobber, Mr. Small related, and he raised the question as to whether or not it might not be packaged in some standard form so that the jobber might reship it conveniently.

On this task, Mr. Small said, it may be that the committee will grade all packaged items as (1) Satisfactory; (2) Could be improved; (3) Satisfactory.

Of Task No. 4 "to develop more sources of material for resale," Mr. Small pointed out that this does not mean to increase the number of those now serving the jobber, but to induce added sources to provide the jobber the opportunity of offering such products for resale.

Mr. Small brought up the question of the kind of establishments that may be selling household refrigerators and freezer-storage chests after the war. Will such products be sold through filling stations, grocery stores, general stores?

"Tire company chain stores, who sold refrigerators and other appliances before the war, have used these items to increase the store's net profit," said Mr. Small. "Keep that point in mind—these extra, unusual items were sold to make the individual store operation more profitable.

"In answer to my query directed to one of the leading tire manufacturers I got a reply which said in general that 'we favor national brands, and will cooperate with the general distribution methods and policies established by the manufacturer of the national brand.'

"A large milling concern that has war plant equipment wrote in answer to an inquiry that 'the small appliance equipment field looks interesting to us, but we don't entertain the idea of selling such items through grocery stores, or using any other outlandish method of distribution.'"

Mr. Small expressed the opinion that there are two basic types of markets—rural and urban. Possibly both the type of product and the type of distribution might have to be different for the rural market. For example, Mr. Small made a short survey of his own on preferences for open or hermetic-type units, and found that rural dealers were nearly unanimously for the open type, and urban dealers unanimous for the hermetic.

With respect to the possibility of parts and supply jobbers handling appliances, said Mr. Small, there arises the questions: Would the jobber be responsible for the service on such appliances? If so, does that affect his status as a jobber under the generally accepted definitions of a jobber?

Of Task No. 5 "to study the factors which make the sale of refrigerants relatively unprofitable—" the national chairman said that while much of this problem would have to be settled with manufacturers, the jobbers hoped to realize some setup wherein most of the profit on refrigerants would not go to the railroads.

Following Mr. Small's discussion the meeting, with Mr. Oberc as moderator of the discussion, took us the task assigned it:

"To clarify the definition of an assembly manufacturer as it may affect the cost of his purchases so that he will receive all the benefits due his manufacturing functions, yet, at the same time, to define these functions so that they shall not provide him with a means of unfair competition with other jobbers, contractors, or dealers."

There was more than an hour's discussion on this matter and considerable disagreement on many of the points covered, but out of the discussion the following points developed:

(1) What bothers the parts and supply jobber in this matter is that there are small, local "fixture" manufacturers who assemble a complete refrigerated fixture and generally sell it at retail, but who buy parts at a manufacturer's price which they may sometimes also sell at retail.

(2) However, what the association is seeking from the task committee is a more or less standard definition of an "assembly manufacturer" so that once defined, some sort of an understanding can be reached eventually on the matter of how such a concern is to be sold.

(3) The point was made by Mr. Oberc that there might be a divergence of opinion on the matter of such a definition by product groups, so that it might be necessary for each product group among the parts manufacturers to develop their own definition.

The meeting finally reverted to the original task of "defining an 'assembly' manufacturer" and this definition developed which seemed satisfactory to most of the jobbers and manufacturers present:

"An assembly manufacturer shall be defined as one who

"(1) Assembles a substantially complete refrigerated system with or without highside;

"(2) Sells such product primarily at wholesale;

"(3) Purchases component parts primarily for installation in his manufactured (or assembled) product;

"(4) Resells purchased component parts only for service on his own equipment and at regularly published resale prices."

This definition is to be submitted to the National Manufacturers-Jobbers Relations Committee for such action as may be deemed fit by that committee.

When Coast Jobbers Tackled Their 'Task'—

This picture by Lawrence P. Roth of Refrigeration Service, Inc., shows the "all-out" turnout of far western parts and supply jobbers for a district manufacturers-jobbers relations committee meeting. Back row (left to right) are Van Ginkle, Harold Clay, Ray Moran, Robert A. Paton, Robert Hinshaw, E. R. Nottingham, Harry Alter (national president, who attended the meeting), Peter H. Askew, Harold Halls, and Orville G. Phillips. Seated are Gordon Clark, B. E. Watters, C. E. Baker, George Eskra, Harold Stern, Wyatt R. Brown, William Messemer, R. C. Hurd, "Doc" Armour, Leland B. Flint.

All Far West Jobbers At Los Angeles Meeting

LOS ANGELES — Refrigeration parts and supply jobbers of the far west met here Feb. 22 to discuss mutual problems and a task assigned it by the Manufacturers Relations Committee of the National Refrigeration Supply Jobbers Assn. The meeting was the first of its kind on the Pacific Coast in which every jobber from Vancouver to San Diego, and as far to the east as Phoenix and Salt Lake City, was represented.

A closed meeting of the jobbers was held in the morning with Harry Alter, president of the National Refrigeration Supply Jobbers Assn., at which time Mr. Alter reviewed the work of the association and also discussed the new program of the Manufacturers Relations Committee. Following luncheon there was a general discussion of the tasks assigned.

A dinner meeting was held to which manufacturers and manufacturers' representatives were invited, with a total of 68 persons being present.

Robert O. White of Day & Night Mfg. Co. and Hy Jarvis of Refrigeration Engineering, Inc., talked on their experiences as members of the General Refrigeration Industry Advisory Committees.

Par Model HA-2

● Fits like a glove . . . engineered and designed for small display cases and large domestic applications.

● A sturdy ¼ H.P. 2 cylinder air cooled unit with large condenser and bull's-eye sight oil gauge.

● Embodies the 28 PAR features . . . slow speed . . . and fast pump down.

● *Write for illustrated brochure of details.*

● *BY COMPARISON—YOU'LL BUY PAR.*

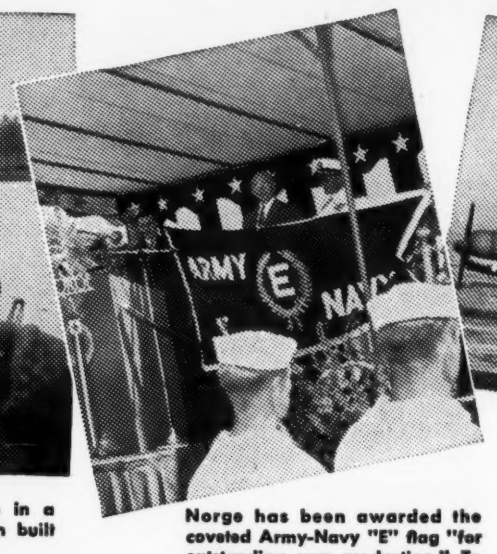
PAR Division

LYNCH MANUFACTURING CORPORATION
Defiance, Ohio, U.S.A.

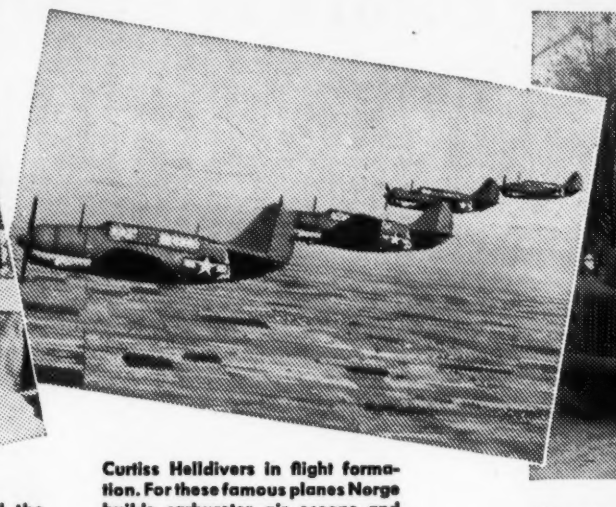
Commercial and Domestic
REFRIGERATOR HARDWARE

NATIONAL LOCK COMPANY
ROCKFORD, ILLINOIS

Camouflaged marines approach their objective in a landing boat equipped with marine transmission built by Norge. (Official U. S. Navy photograph.)

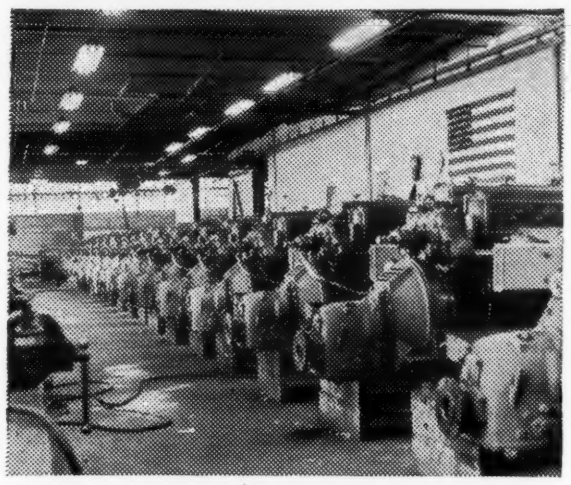


Norge has been awarded the coveted Army-Navy "E" flag "for outstanding war production." To date one star has been added.



Curtiss Helldivers in flight formation. For these famous planes Norge builds carburetor air scoops and flex gun turrets.

Transmission gears for this 1½-ton Army truck (Ford) are among the 40-odd war items made by Norge.



A battery of Norge-built transmissions being tested on landing craft engines.

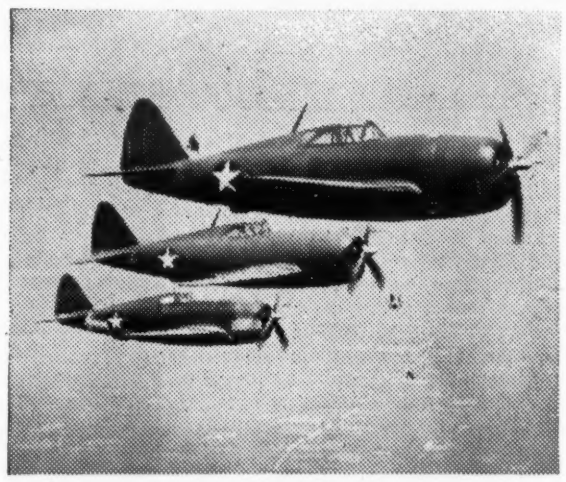
NORGE
"Line" for '44

Largest and most spectacular we have ever offered!

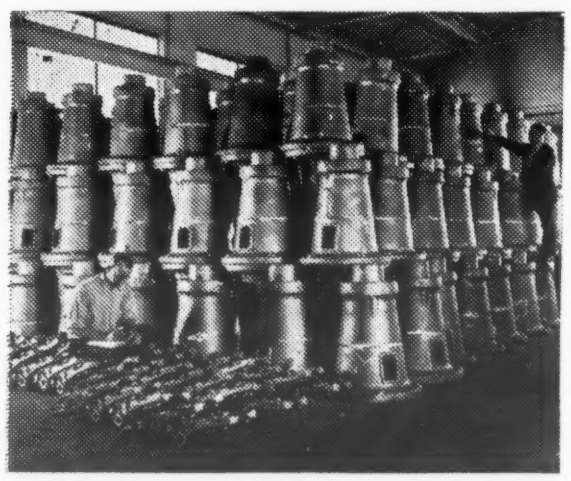
The engineering skill and precision workmanship required to build intricate products to Army and Navy specifications illustrate the flexibility of the Norge manufacturing operations. The fact that Norge can produce so many and such a variety of products augurs well for the peacetime production of home appliances. The new knowledge, skill and techniques acquired while working for Uncle Sam will be reflected in the postwar products made available to Norge dealers when peacetime production is resumed.

In this Norge plant are machined the transmission gears used in the Ford 1½-ton Army truck.

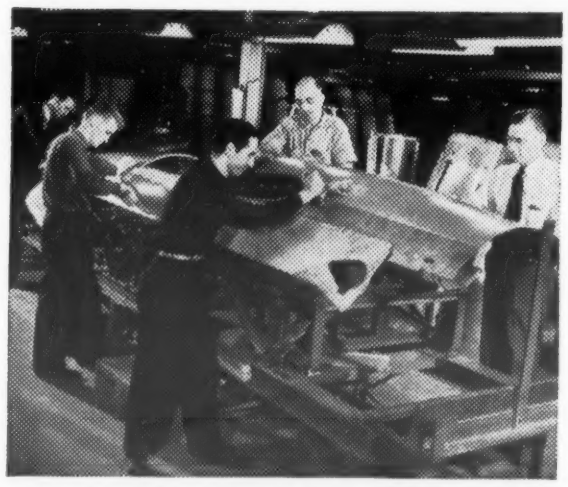
Marines grab a bite during a lull in battle. Mounts for this 20-mm. anti-aircraft gun are made at Norge. (Official U. S. Navy photograph.)



The famous Republic P-47 Thunderbolt, for which Norge makes bottom cowl and exhaust shroud assemblies.



Castings at the Norge plant prior to machining into pedestals for Mark IV Oerlikon gun mounts.



After fighting Japs on New Guinea for 20 months, one of these men now helps build the belly cowl for the P-47 Thunderbolt in the Norge plant.

WESTERN UNION

-802P1 LGNMUX TDN FARMINGDALE NY P1 A 1?? ... 1? ?? PM 6 46
H E BLOOD,PRESIDENT NORGE DIVISION BORG WARNER CORP
670 EAST WOODBRIDGE ST DETR

YOUR ACCOMPLISHMENT IN DELIVERING ASSEMBLIES FOR P-47 THUNDERBOLT RIGHT UP TO SCHEDULE IN 1943, IS GREATLY APPRECIATED. YOUR WILLINGNESS TO MEET UNUSUAL PROBLEMS AS THEY DEVELOP HAS BEEN DEMONSTRATED TIME AFTER TIME NEEDLESS TO SAY THE COOPERATION OF YOUR ORGANIZATION HAS BEEN A TREMENDOUS HELP IN BUILDING THUNDERBOLTS FOR THE ARMY AT A TIME WHEN EVERY PLANE COUNTS IN KEEPING CASUALTIES TO A MINIMUM AND SOFTENING THE DEFENSES OF OUR ENEMIES YOUR RECENT LETTER ANNOUNCING A THIRD VOLUNTARY AND SUBSTANTIAL PRICE REDUCTION IN COST OF THESE ASSEMBLIES, HAS BEEN RECEIVED AND MAY WELL BE CALLED PERFORMANCE BEYOND THE LINE OF DUTY.

CONGRATULATIONS AND THANKS FOR A FINE JOB.

ALFRED MARCHEY PRESIDENT REPUBLIC AVIATION CORP.

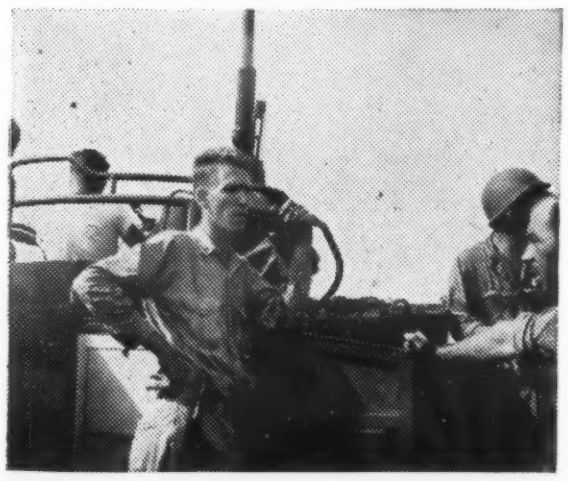
P-47 1943.

NORGE

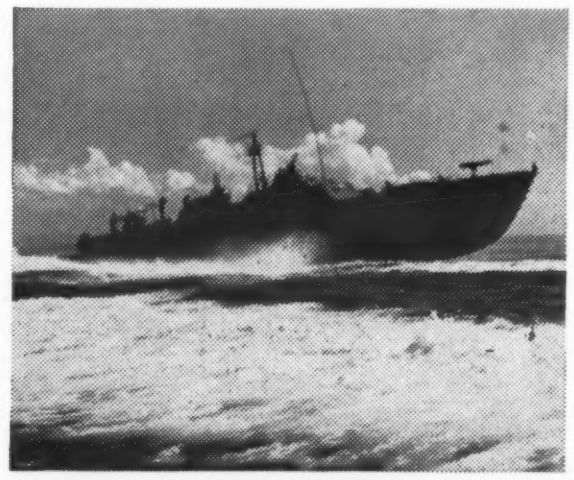
A BORG-WARNER INDUSTRY

NORGE DIVISION, BORG-WARNER CORPORATION, 670 EAST WOODBRIDGE ST., DETROIT 26, MICHIGAN

***Only prewar producer of a complete line of* ROLLATOR REFRIGERATORS ★ ELECTRIC RANGES ★ WASHERS ★ GAS RANGES ★ HOME HEATERS ★ COMMERCIAL REFRIGERATION**



Lt.-Comm. Robert B. Kelly of "They Were Expendable" fame on the deck of a PT boat equipped with gun mount of a type built by Norge. (Official U. S. Navy photograph.)



U. S. Navy PT boat. Norge builds .50-cal. twin machine gun turrets for similar craft (Official U. S. Navy photograph.)

Above are just a few of 40 important war assignments of NORGE Division

That Kitchen of the Future Is Likely To Be Larger, With Many New Items

More Storage Space and Eating Area Demanded; Frozen Food Chest, Dishwasher on 'Desire' List

By Mary Davis Gillies, Home Furnishing Editor of "McCall's Magazine"*

I'm reminded of a certain famous kitchen conference held in Boston just about 10 years ago. It was decided then that there was bigger game than the mere sale of kitchen appliances; that popularizing kitchen planning and the all-electric kitchen should be made an industry project.

The program clicked and since then everyone who has ears to hear or eyes to see has become acquainted with the basic elements of kitchen planning. There probably isn't a home service director of a utility company who hasn't exclaimed, "Aren't you fortunate, Mrs. Smith, you can have a perfect U-shaped kitchen." Or, "Your kitchen will be no problem to remodel, Mrs. Jones. It calls for an L-shaped working area and the eating unit can go over there."

As a result of this A.B.C. approach, literally speaking thousands of kitchens have been remodeled, involving the sale of thousands of automatic refrigerators and/or electric ranges and thousands of feet of kitchen cabinets.

The program worked, so it may, in a sense, be called successful. But my feeling now is that a change in point of view is called for. We are living in the midst of a world crisis and we are all taking a major jolting. Such a basic disturbance inevitably brings change. Ideas which were only obscure trends, will move to the front.

Review in your mind the dramatic changes which came about in our way of life in the 10 years between 1915 and 1925. That period saw the introduction of short skirts, rolled socks, women's votes, automobiles for everyone, bobbed hair, cheek-to-cheek, nice women smoking in public, and prohibition. Inevitably, an even greater renaissance can be expected between 1945 and 1955. Old formulas, old standards, old methods and old materials will gradually be eased out. Because our lives, our way of living and, in the kitchen, our way of handling food is changing.

For instance, in 1915 in my home, hours were spent in the kitchen at meal preparation. Now I can prepare a very respectable dinner in 18 minutes flat. This speed-up is made possible by new developments, developments of the last few years such as dehydrated soups, prepared desserts, frozen foods, precooked frozen beans, pressure saucepans as well as simplified menus.

Let those who honestly believe it, say that there will be no change in appliances and kitchens during the 10 years after the war. They are not even kidding themselves.

DINING ROOMS AND DINOSAURS

The changes in handling food and developments in appliances will not account for the only modifications in the postwar kitchen.

Without question we are headed toward a building boom. The largest building volume will center in houses costing from $4,000 to $8,000. Probably little change will be seen in houses built during the first two years; then, and I am not alone in this opinion, profound changes will begin to appear. Especially important to this group will be the rearrangement of the first floor.

Let's stop a minute and each of us look back at our own homes, when we were 12. Not one of us lived in a house without a dining room.

In the Davis household back in Bellingham, Wash., we had a large wood paneled dining room with a huge round table, a body Brussel rug and a built-in china cupboard with leaded glass doors. Luncheon and dinner were always served in the dining room on leathery white double damask and all of the fixings that implies. Other formalities were observed. We children simply didn't eat if we weren't on time and no slang was permitted at the table.

How would such a regime get by in the average household today? Be sentimental and say if you want to that it was a grand way to live and a sound basis for family life. But face the facts about today and admit that the pressure of school projects and the far-flung activities of the whole family make it impractical to carry on such severe family discipline. This is not a formal dining era, it is a snack-bar age. Speaking for myself, I haven't had a home with an honest-to-goodness dining room since 1933. Yes the dining room per se is doomed.

Today 95% of the families live informally. Only the few have ever had maids in this country and we have lived to see the day when even those few are almost non existant. Gradually women are beginning to realize two things:

1. That meal preparation is a quick easy job.
2. That a planned informal eating area in close proximity to the kitchen is more generally useful for the woman who does her own work than a remote and more formal dining room.

SOME FIRST FLOOR PLANS

As a result of this realization, open planning for first floors is inevitable and the vote by women in the recent decorating contest in "McCall's Magazine" confirms this belief.

Three first floor plans were included in the kitchen contest folder. In Plan No. 1 the dining room, kitchen and living room were each a separate cubicle. In Plan No. 2 the kitchen was separate but the living room and dining room were one large area. In Plan No. 3 the kitchen was divided from the recreation area by a curtain wall or partial partition.

The vote on this point was interesting. In order to accurately get the picture, it is necessary to divide the votes in half. "McCall's" kitchen contest was one of four run by the magazine, the other three being on the living room, the dining room and the bedroom. In all four contests about 50% of the contestants voted for the "modern" room and 50% for the "traditional" room. Only on the kitchen was the vote slightly less for the "modern" room. On the other rooms the modern room led.

The "traditional" contingents are sentimental about their homes. They believe deeply, even hysterically, that what was good enough for mother and grandmother is good enough for them and that a woman who complains about housework doesn't deserve a home.

As you would expect, these "traditionally" minded women voted 3 to 1 for Plan No. 1—the isolated, separate room kitchen with appliances, arrangement and materials similar to those we have. But even though they feel that life is not complete without a dining room, these women admit that the majority of meals in their

(Concluded on Page 11, Column 1)

*A speech given to the Edison Electric Institute Conference, Piedmont Hotel, Atlanta, Ga., Feb. 28, 1944.

MASTERCRAFT
ADJUSTABLE PAD AND CARRYING HARNESS

Used and endorsed by thousands of refrigerator dealers in the United States and Canada.

Pad is adjustable to all makes and sizes of refrigerator cabinets; thoroughly protects finish of cabinet from scratches and mars during moving; easily and quickly put on or off; sturdy, lasting construction; easily pays for itself in a short time. Price $11.75 each.

Attractive lettering of your name on pad at $2.00 each extra.

Harness is a separate unit from the pad, is adjustable, and provides a simple and convenient arrangement for carrying your refrigerator more safely and easily. Price $8.50 each.

Write for complete folder and prices on pads for refrigerators, washers, ironers, ranges, radios; also furniture pads and protective covers. . . . All prices subject to change without notice.

BEARSE MANUFACTURING CO.
INCORPORATED 1921
3815-3825 Cortland Street, Chicago 47, Illinois

HOW LONG

Look, Honey!—An automatic waffle iron! Let's get it!
Can we have the percolator, too?
We've been wanting this fan since before Pearl Harbor.
Pardon me! Do you have this clock in red?
How soon can you deliver an electric range?
GE

Contest Reveals Kitchen Design Faults, New Appliances Housewives Want

(Concluded from Page 10, Column 5)

homes are served in the kitchen and that a kitchen eating area is important.

On the other hand, the approximately 50% who voted for the "modern" room and "day-after-tomorrow" kitchen have a stimulating attitude toward new developments. Reading their entries is like a breath of fresh air. These women are interested in and aware of modern day developments and Twentieth Century habits.

Not all of those who voted for the "day-after-tomorrow's" kitchen approved of open planning but almost half voted against a first floor divided into cubicles or separate rooms labeled "Kitchen, Dining Room and Living Room." With infinite variations they realized that a first floor with one area devoted to service and one to recreation would more fully meet their requirements.

Even if I haven't convinced you of the value of open planning for the average small house and the desirability of avoiding stereotyped kitchens in favor of those adjusted to the family, let there be no question of the desirability of including some type of eating area in the kitchen.

BEFORE PLANNING A KITCHEN

Before forming a formula "U" or "L" shaped witchen for a client, here are some other points which should be discussed with the family. The answer to each one should make a difference in the way the kitchen plan is handled.

- Is there a great deal of entertaining?
- Is the family elderly and static or young and growing?
- Is the family whimsical, practical or conventional?
- Is there a basement?
- Is there an attic?
- Is there a back porch?

—and don't think the answers to these following questions won't affect storage.

- Should any hobby space be included in the kitchen?
- Where is sewing, washing and ironing done?
- What are the family's standards in table service? High, medium or low?
- What small electric appliances does the family have or want which would be in constant use?

Going back to the "McCall" kitchen contest, other points or complaints about present kitchens centered around four features. About 30% found their present kitchens too small. 41% said their present kitchens were inconvenient to work in. 30% also complained about their sinks. But the real bitterness came out when storage and counter space was discussed. Sixty per cent said that they didn't have enough storage space and 50% declared that their counter space was wholly inadequate.

THE JIG-SAW PUZZLE GAME

It wasn't until I started to read the volunteered remarks of the contestants that I realized that this kitchen planning thing was getting out of hand. In fact, I'm almost afraid that we have created a Frankenstein. American women are really becoming vocal about their kitchen wants and if I'm any judge, recognizing a need is the first step to satisfy it.

Not a hundred years ago the only provision made for a kitchen was a place to cook, shelves to store things and a table to work on. Eventually, running water and a sink were added. And only in the last quarter of a century refrigeration has become an important factor.

In addition to these basic factors let me list some of the other frequently recurring items which some women in this year of our Lord now feel that they must have in their kitchens.

- Automatic dish washer.
- Frozen food locker.
- A desk or management center with book shelf and recipe files.
- Ventilating fan.
- Towel dryer.
- Tray storage.
- Automatic system of sterilization affecting germs, insects, vermin and odors.
- A wheel table. A warming unit to equip it for meal service.
- A radio.
- A mirror.
- Fluorescent lighting.
- A bulletin or black board.
- A telephone extension.
- Tall storage for pots and pans.
- More efficiently planned cleaning closets.

In addition to these items many women wish to have some or all of their laundry equipment in the kitchen or kitchen area.

In other words, kitchen planning handled expertly is no longer a cinch and cannot be handled by formula alone. It may involve the removal of partitions, the introduction of windows and the rearrangement of appliances. It certainly will involve the planning of the right eating center.

Moreover, even if we think we are graduate kitchen planners now, we need a post-graduate course so that we can cope efficiently with new kitchen developments. We will have to know the ins and outs of installing fluorescent lighting, frozen food lockers, new dish-washing units, as well as all of the nuances of planning first floor laundries.

Gov't Will Finance Boom Area Stores

BALTIMORE, Md.—After nearly two years, R. E. Ottenheimer, refrigeration designer, engineer, and merchandiser, had the satisfaction of seeing a project he advocated for government financing of stores and shops in crowded war-boom areas be recommended by President Roosevelt in a recent message to Congress requesting appropriation of $150,000,000 "to provide necessary services to meet the need of mushrooming population."

In an article in the June 8, 1942 issue of AIR CONDITIONING & REFRIGERATION NEWS Mr. Ottenheimer outlined the plan he had presented government officials.

It was his contention that much dissatisfaction and absenteeism among new workers and residents in boom areas is caused not only by the lack of adequate housing facilities but also by a shortage of food stores, drugstores, shops, and restaurants.

Mr. Ottenheimer asked that the Federal government appoint one of its agencies and appropriate money to aid established merchants in expanding their present operations or in setting up new ones more conveniently located to war-swollen communities.

The Federal Works Agency is now handling the program suggested by Mr. Ottenheimer. In a letter to President Roosevelt advocating the plan, Budget Director Smith pointed out that such facilities as constructed under the proposal "would be operated by private enterprise and not by the Government."

WILL YOUR WAVE OF POSTWAR PROSPERITY LAST?

When peace comes, an unprecedented wave of buying will lift the appliance business to a new demand peak.

The buying public will *have* money to spend. And they'll not only *want* to, but need to, spend it in a hurry on appliances, any kind at all, good, bad, or indifferent. They'll buy rashly to replace worn-out appliances, unreplaceable for so long.

For a time the enthusiastic buyers won't care whether the articles they want have been made by General Electric or The Gimcrack Co. And naturally, *your* business will be affected . . . swamped momentarily by this wild wave of careless buyers. They'll clamor for goods, regardless of quality.

If they don't care what they buy, then you, in desperation to satisfy their demands for merchandise, might decide that it didn't really matter what caliber of goods you handle.

That would be a grave error. It always is, when *customers* are sacrificed for *sales*.

The man who wants to be in business a *long* time gives *short* shrift to inferior merchandise.

He knows that while he may sell customers *once* on inferior merchandise, those customers will not return for a second disappointment.

• • •

The lesson you can draw from this is a simple one. It *never* pays to buy or sell inferior goods. The best possible guarantee of continuing prosperity in the long run, in the years that will follow the postwar boom, is to decide that your business is going to win *customers,* not merely single sales . . . that you're going to offer your customers *only* the caliber of goods that will make permanent friends.

If that's what you prefer to do, if you sincerely want a steady successful pull in the long haul ahead, perhaps the name of General Electric beside yours will help make *your* wave of prosperity *last*.

General Electric Appliance and Merchandise Department, Bridgeport, Conn.

Everything Electrical for After-Victory Homes

GENERAL ELECTRIC

Hear the General Electric radio programs: "The G-E All-Girl Orchestra" Sunday 10 P. M.—E.W.T. NBC
"The World Today" news every weekday 6:45 P. M.—E. W. T. CBS

Important war production can be halted through so simple an accident as the failure of a belt on air conditioning and refrigeration equipment. Little things can do a lot of harm.

Gilmer BELTS

That's why you'll find it wise to feature Gilmer Belts, and be set for replacement business and service jobs of this type. Rugged, long-lived, efficient Gilmers are good-will builders that bring you a profit. Order through your jobber . . . he's ready with Gilmers.

L. H. GILMER CO.
Tacony, Phila. 35, Pa.

Your refrigeration parts and supply house in Central New York and Northern Pennsylvania

TED GLOU

CENTRAL SERVICE SUPPLY CO.

409 E. Jefferson St., Syracuse, N. Y. Phone 5-4000
209 Jefferson Ave., Scranton, Pa. Phone 3-4000

Have You Tried
AIRO SUPPLY Lately?

Next time you "talk shop" with another Service Engineer, be prepared for that question! He and plenty more like him in all parts of the country have found out through personal experience that the AIRO slogan means what it says:

"You'll Like To Buy From AIRO SUPPLY"

And that goes for you, too — wherever you're located.
Send for your copy of the AIRO "VICTORY" CATALOG now.

AIRO SUPPLY CO. WHOLESALE DISTRIBUTORS Refrigeration Parts & Equipment 2732 N. Ashland Ave. Dept. C., CHICAGO 14, ILL.

Utilities Will Push Frozen Food Units And Newer Appliances After the War

Intensive Promotion on All Appliances Is Planned, Hotpoint Survey Shows

CHICAGO—Utilities will merchandise major appliances more than ever after the war, but much of their promotional effort will be concentrated on the newer load-building appliances still lacking complete consumer acceptance — home freezers, dishwashers, waste disposal units, clothes dryers, etc. — indicates a broad survey of 286 utilities recently completed by the Commercial Research Division of Edison General Electric Appliance Co., Inc. here.

The utilities covered in the study include straight electric companies, combination gas and electric companies, and 62 municipal light and power plants, according to A. H. Jaeger, manager of Hotpoint's Utility Division. In all, they represent 78% of the domestic electric meters in the United States, the report states.

What position the independent appliance dealer will hold after the war in relation to the utility is rather clearly indicated by the results of the survey. Dealers will benefit, utilities think, by the extensive promotion activities which many utilities expect to revive after the war, and by the direct dealer helps planned.

The number of dealers has fallen off since the beginning of the war, utilities say, but their answers to this question in the survey were not altogether clear-cut, Hotpoint reports, since numerous appliance dealers are still in business, but they no longer sell appliances. Utilities believe dealers will be back stronger than ever after the war.

In the year ended Dec. 31, 1941 for each 1,000 electric meters there were 1.6 dealers, estimate the utilities. A year later the figure had dropped to 1.4 and by Dec. 31, 1943 it had fallen to 1.0. Twelve months after the war ends should see the figure zoom to 1.7, the Hotpoint survey indicates.

INCREASES ARE EXPECTED

Widespread belief that sales of appliances will rise after the war is shared by the utility companies. Their actual estimates of percentage of increase of various major appliances in the first year of peace, however, are based on the number of appliances they think will be allotted to the utilities and not on consumer demand, points out the survey.

Out of 286 utility companies, 162 reported that they expect an increase of 8.6% in electric ranges in the "Victory Year" over 1941. Out of 286 utilities, 117 expect an increase of 85.6% in electric range sales in the fifth year after victory, over 1941.

On refrigerators, 145 companies expect a 3.3% decrease in sales from 1941 in the first postwar year, but 100 out of 286 expect a 24.9% increase by the fifth year.

Water heaters are due for 22.5% increase over 1941 in the "victory year," say 152 utilities, while 112 companies see an increase of 161.8% in the fifth year.

Electric refrigerators have the highest saturation point of all the appliances covered by the survey. In 1943 they were rated at 65.5% by utilities, while ranges were estimated at 13.0% of saturation and water heaters, 4.2%. The high saturation point of refrigerators doubtless influences utilities' estimates of future refrigerator sales.

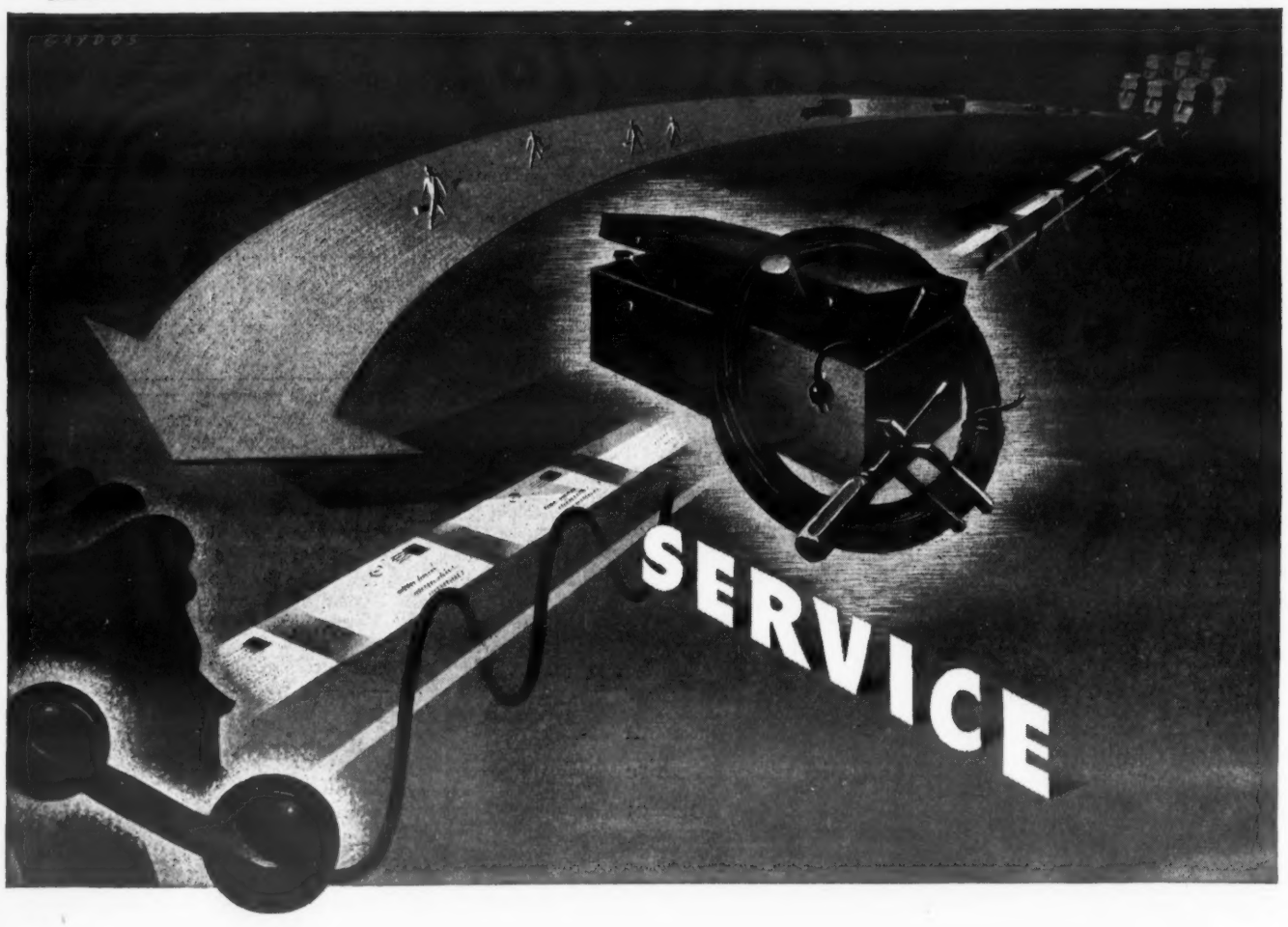
Postwar merchandising plans of utilities indicate increasing attention to the new appliances. "The number of utilities interested in range, water heater, and refrigerator sales has remained about the same," says the report, "evidently the result of the feeling that dealers are strong enough to carry a satisfactory volume."

Of the 286 utilities included in this survey, 184 reported that they had merchandised one or more major appliances in 1941. In "19V1" (one year after "Victory") 181 utilities definitely indicate that they will mer-

(Concluded on Page 13, Column 1)

Table 1 - Here's What Utilities Will Sell

	—1941— No. of Utilities	% to Total	—19V1— No. of Utilities	% to Total
Total number of Utilities Merchandising	184	.....	181	.....
Ranges	180	97.8%	173	95.6%
Water Heaters	175	95.1%	171	94.5%
Refrigerators	154	83.7%	143	79.0%
Dishwashers	68	37.0%	123	68.0%
Clothes Dryers	13	7.0%	105	58.0%
Waste Exits	50	27.2%	109	60.2%
Clothes Washers	124	67.4%	123	68.0%
Ironers	122	66.3%	118	65.2%
Household Quick-Freeze Storage Units..	16	8.7%	140	77.3%



EYES AND EARS IN THE FIELD

The Service Department of Crosley is the eyes and ears of Engineering on the firing line.

First, it tests new products and new developments under actual conditions of use. Then, it goes into American homes as the trouble-shooting squadron of Crosley. There it diagnoses causes of failure, corrects the difficulty and tells the factory how similar situations can be minimized in the future.

These highly-trained people, serving distributors and dealers, are the nucleus that is building solidly and skillfully for postwar markets. Theirs is the task of aiding the control of quality, of reducing faulty equipment from suppliers, of smoothing the path of Management, Engineering and Sales.

This is the seventh of series describing the various departments working together as a team in the Manufacturing Division of Crosley. The subject of this advertisement is Service.

CROSLEY

THE CROSLEY CORPORATION · CINCINNATI, OHIO AND RICHMOND, IND
Peacetime Manufacturers of Radios, Refrigerators, Household Appliances, and the Crosley Car
HOME OF WLW, "THE NATION'S STATION"

MANAGEMENT | ENGINEERING AND RESEARCH | PLANNING AND SCHEDULING | PURCHASING | MANUFACTURING | QUALITY CONTROL | SERVICE | SALES | ADVERTISING

SCRAP IS POWER
YOU HELP
... the War Effort
... Your Customers
and Yourself
... when you Salvage, in accordance with your Manufacturer's Instructions, all inoperative parts containing ....
CRITICAL MATERIALS
Cooperate with your industry! Put vitally needed scrap back into the Scrap
TODAY!

You Can help your community be "food self-sufficient" by getting back of the Victory Garden program — NOW. Make food grow where grass and weeds grew before.

You Will profit in direct proportion to the effort you put back of it — not only now but in the years that follow. (Build your following now.)

You Must relieve and augment the canned fruit and vegetable situation by providing ample storage space for the Victory Garden crop.

MASTER FOOD CONSERVATORS

are the answer to your locker problem. They're solidly built of STEEL by men who pioneered the industry. They have features that assure profitable and economical Locker plant operation. It costs no more to get the "Choice of the Industry."

Write, Phone or Wire your requirements. Safeguard your investment by installing the first-cost, last-cost completely STEEL unit. Details will be sent upon request.

Endorsed by and sold through distributors of refrigeration and insulation.

Master Manufacturing Corp.
121 Main St. Sioux City 4, Iowa

Member of Frozen Food Locker Manufacturers and Suppliers Ass'n organized for your protection.

Over 400,000 Master Food Conservators in Use

Utilities' Postwar Plans Include Aid For the Dealer

(Concluded on Page 12, Column 5)

chandise. Fifteen utilities are undecided about merchandising, and 90 are definitely non-merchandising companies, although a large percentage of the latter say they will help dealers in one or more ways (see Table 2).

As shown in Table 1, there will be a vast increase over 1941 in the number of merchandising utilities that will handle household quick-freeze storage units, dishwashers, waste exits, and dishwashers in the first postwar year.

TREND TO NEWER LINES

Only 16 utilities sold household frozen food cabinets in 1941, but in "19V1" there'll be 140 utilities handling this unit. Dishwasers will be handled by 123 utilities instead by the 68 in 1941. Clothes dryers will be merchandised by 105 utilities, compared with 13 in 1941, while 109 companies plan to sell waste disposal units in "19V1," compared with 50 in 1941.

Whether or not they merchandise the four appliances mentioned above, the majority of utilities intend active advertising and promotion of them after the war. The household frozen food storage unit will be promoted by 187 utilities, dishwashers by 168, waste exits by 139, and clothes dryers by 133. Other new appliances, not mentioned specifically, will be promoted by 138 utilities.

TO INCREASE SALES STAFF

The expected and planned-for increase in appliance sales after the war will mean an increase in the number of retail appliance salesmen employed by many utilities, the survey indicates. More salesmen will be hired by 110 utilities, and 121 plan to maintain the same size crew they had in 1941. Only three of the 286 utilities surveyed plan to have fewer than they did in 1941.

Incidentally, more home economists will be added by 110 utilities, and 115 will have the same number as in 1941.

In connection with helps to dealers, all of the 286 utility companies answering the questionnaire indicated that under the sales plans which they would set up after the war, the dealers would be able to compete at a profit.

However, 83 of the merchandising utilities do not recommend that dealers handle the same brands as the utility. Almost the same number, though, 69, do recommend that dealers handle the same brand. Six utilities plan to leave the choice of brands entirely up to the dealer, according to the Hotpoint survey.

FEW PAY INSTALLATION COSTS

The survey also brought out that the trend is away from utilities' paying all of the installation costs for the big load-builders — ranges and water heaters—and for dishwashers, too. No allowance on installation cost of electric ranges is planned by 158 utilities, with only 14 planning to pay all the cost. Some 52 expect to pay part of the cost.

Allowances on water heater installations are out for 143 companies. Part of the cost will be paid by 46, but 15 say they will pay all of the installation cost. Only three companies will meet all installation costs on dishwashers, 13 planning to pay part of the cost, and 193 none of it.

Greater percentage of municipal utilities proposes to pay part of all of the installation costs on ranges and water heaters than do privately owned companies, the survey shows. On ranges 40.3% of the municipal plants will pay part of the cost; 15.8% all the cost; with 42.1% paying none of the cost. Of the private companies 14.1% will pay part on ranges, 2.4% will pay all, and 65% won't pay any part.

On water heater installations 38.6% of the municipal plants will pay part of the cost, 14% all the cost, and 45.6% none. The private utilities line up on water heater installations thus: 13% will pay part; 3.8% all; and 63.2% none.

Dealers will be extended the same installation allowance plan as used by the utility by 141 companies, the survey showed. Two utilities said, "No," but there was no indication of just what plans would be extended in place of the utilities' own plans.

Comparatively few of the utilities contemplate any adjustments in electric rates that would affect sales of electric ranges and water heaters. Thirty-six said, "yes" on ranges and 33 replied the same on water heaters. No changes for range rates are planned by 189 companies, and 191 utilities plan no changes that would affect sales of water heaters.

PLUMBERS ENTER THE PICTURE

Increased promotion, and undoubtedly increased sales, of water heaters and dishwashers after the war will bring plumbers increasingly into the retail selling picture after the war, utilities suspect. Plumbers' sales of appliances after the war will increase in relation to total sales, believe 148 utilities, while 60 companies say they won't.

Majority of utilities, 56.6% of those surveyed, favor long term payments for major appliances, but 31.8% indicated they were opposed to them. Maximum length of long term payments for the majority of utilities was set at 36 months, with the overall figures ranging from a minimum of 12 months to a maximum of 60 months.

Plans for extending terms on combination sales of appliances are in the making by only 23.1% of the utilities, according to the survey, while 49% are making no such plans.

Trade-in allowances are planned by 32.5% of the utilities, but 37.4% definitely stated that they aren't planning any trade-in allowances. However, 57.7% said that the electrical appliance dealer would be included or protected in their trade-in plans, and only 8% declared that they were making no provision for the dealer.

Table 2 - They Won't Sell, But They'll Help

"If you do not merchandise, will you have a cooperative promotional program for dealers?" (Question asked of the 90 non-merchandising utilities.)

	Yes	No	Uncertain	No Answer
Will Utility Salesmen Help Dealers Sell?.	46	36	2	6
Will Utility Field Men Contact Dealers to Help Promote Sales?.....	59	24	1	6
Will Utility Send Direct Mail Pieces to Consumers?.....	55	19	6	10
Will Utility Do Consumer Newspaper Advertising?	67	15	3	5
Will Utility Have Cooperative Newspaper Advertising Plans For Dealers?.....	35	36	11	8
Will Utility Have Radio Programs?....	36	36	12	6
Will Utility Use Billboard Advertising?..	34	37	8	11

Lauer Placed on WLB Board

YORK, Pa.—S. E. Lauer, president of the York Corp. here, has been appointed a member of the Philadelphia Regional War Labor Board, Region III, as a representative of industry.

Maintaining,
"UNDER PRESSURE" THE CHARACTERISTIC PRECISION AND DEPENDABILITY OF
KEROTEST
BRASS VALVES
FOR AIR CONDITIONING AND REFRIGERATION SERVICE
KEROTEST QUALITY NEVER VARIES
Kerotest has, since its inception, developed many new and frequently revolutionary type valves to solve complicated industrial control problems. In World War II, Kerotest research and engineering organization is demonstrating its ability to maintain unvarying dependability and precision, despite an unprecedented demand for production. It is meeting that production demand with Kerotest quality valves. With many techniques in utilizing new materials, and designs evolved out of the war program by our research staff, Kerotest offers you a dependable and satisfactory source for post-war valves. Kerotest is looking forward to the time when it can convert its war production to peace-time needs.
KEROTEST Valves
KEROTEST MANUFACTURING COMPANY
PITTSBURGH, PENNSYLVANIA

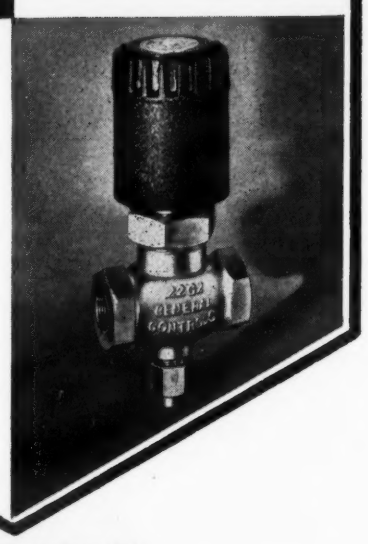
Filtrine
HIGH EFFICIENCY

WATER COOLERS
for
War Plant Cafeterias
Army and Navy Mess Halls
Hospitals
Industrial Applications
QUICK SHIPMENT
Forty years of experience in building special cooling equipment.
Send for complete catalog.
FILTRINE MANUFACTURING CO.
53 Lexington Ave, Brooklyn 5, N. Y.

K-15

MAGNETIC PILOTED PISTON VALVE

GENERAL CONTROL'S K-15, two-wire, current failure, is a high pressure valve handling large capacities with minimum pressure drop. Main valve held open electrically minimizes pressure loss. Packless, available normally closed. Operates on a wide variety of fluids and gases.



Write for Catalog 52.

GENERAL CONTROLS

801 ALLEN AVENUE
GLENDALE 1, CALIF.

Branches: Boston · New York · Philadelphia · Cleveland · Detroit · Chicago · Dallas · Denver · San Francisco

Wartime Manufacturers of Electro-Magnetic and Temperature Controls for Aircraft • Peacetime Producers of Automatic Pressure, Temperature, and Flow Controls.

'Junior Commandos' In Idle Appliance Drive

ASHEVILLE, N. C. — Two-week drive to unearth idle electrical appliances here turned up 40 appliances, reports N. Crowson Cameron, industrial representative of Carolina Power & Light Co.

Three dealers, a representative of a local newspaper's advertising department, Junior Commandos, and Mr. Cameron mapped out and conducted the campaign, which was supported by the three dealers' advertising in newspapers on Sundays before the drive, as well as newspaper publicity.

The Junior Commandos were supplied with tags to be attached to appliances contributed for identification and then sent into their respective neighborhoods to round up contributions. On Saturday afternoons the Commandos brought the appliances they had collected to the depot established on the sales floor of the utility.

Here the three dealers appraised the appliances, paid the Commandos half the appraisal price in War Stamps, and arranged to mail the other half to the donor.

While the campaign was considered to be fairly successful, Mr. Cameron thinks future campaigns would be improved by (1) enlisting the help of all dealers, (2) conducting a longer and stronger advertising campaign, and (3) using an organization of people older than the Commandos who could make a sales talk to prospective donors if necessary.

However, he believes the Commando idea can be of much assistance.

Dealer Sets Up 'Outing Headquarters' To Tide Over Lack of Appliances

He Even Runs a Guide Service To Picnic Spots; Plan Keeps Contacts With Old & Prospective Customers

DOTHAN, Ala.—Appliance dealer Frank M. Harris of Harris Electric Co. here has sold only three refrigerators in 1943—where he used to sell 300 a year.

But he has actually sold every regular customer on the books something else this year, and believes the profit he'll show at the end of the year will be near that coming from major appliances in peace-time. What Dealer Harris has done is to make his store "Outing Headquarters" for the city—and work just as energetically in selling picnic and vacation merchandise as he did with refrigerators.

"I saw an excellent chance to recoup my business and hang on to my old customers when gas and tire rationing came along "Harris grinned. "Right away I decided that the average family wouldn't be able to get out on long motor trips or mountain trips as in the past—and that I could put myself in a good selling position if I would locate nearby vacation spots, advise the public, and sell the needed merchandise.

"Consequently, I turned over my appliance display windows and more than half of the store interior to vacation merchandise, called up my customers and told them frankly what I had in mind, and got more business than I had ever anticipated."

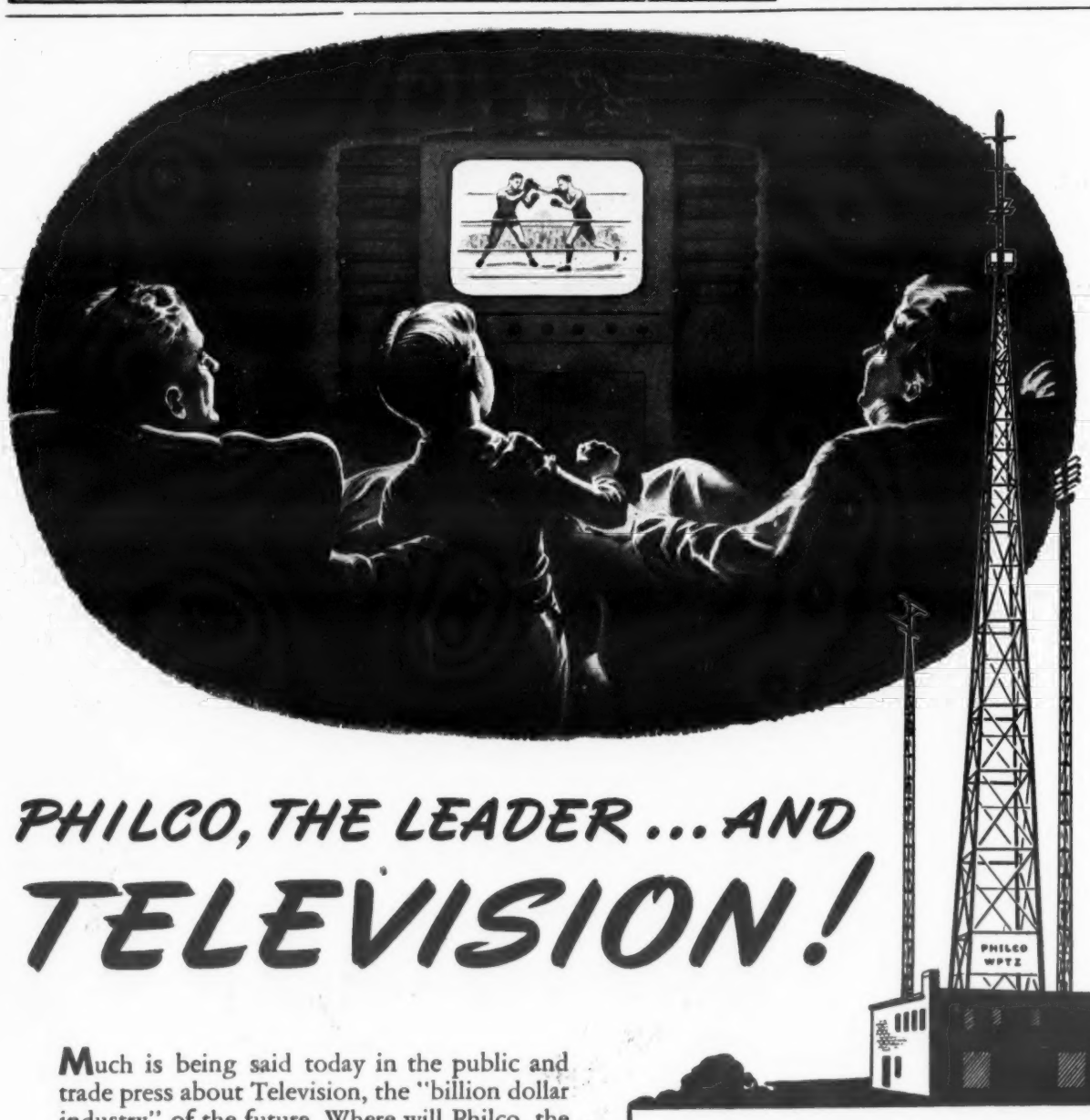
Where shiny ranges and refrigerators used to stand, Harris now shows large beach umbrellas, wood lawn furniture, luncheon hampers, picnic grilles, complete selections of picnic cloths, napkins, paper plates, cups, etc., and a huge assortment of pleasure-giving ideas like softballs, bats, rubber balls, etc. Everything which isn't rationed is there. His idea is to sell "the folks who used to buy from me" on the theme of enjoying vacations in their back yards or close to home, and telling them how to do it.

The first thing he did was to go to the Chamber of Commerce, Boy Scouts, suburban civic committees, etc., to obtain a complete list of little-known picnic spots which could be reached by bus, streetcar or within the four-gallon gas limit. About 50 of these turned up. Harris visited each one, personally, so that he would be able to quote their advantages accurately to later customers. Then he had a mimeographed list made up with complete instructions on how to get to the spot, and began mailing them out to the 2,500 names on his "sold" customer list.

"I got results right away" Harris continued. "A few families came in and asked me where they could spend an all day picnic with the kids next Sunday. I gave them a few choice locations, and sold picnic baskets, thermos jugs, etc. Next day half a dozen women came in, interested, and wanted my lists. I sold more than half of them several items.

"Now, I have a steady stream of traffic after this information, and sell most of them anywhere from $5 to $40 worth of vacation needs." More call over the telephone, and are always grateful for Harris' foresight.

Harris believes the idea has made him a lot of friends for selling after the war. Almost everything he has bought, including sun glasses, suntan lotions, game sets, etc., has sold swiftly—and though he continues a moderate appliance business, he's a "picnic dealer" who created his own market.



PHILCO, THE LEADER ... AND TELEVISION!

Much is being said today in the public and trade press about Television, the "billion dollar industry" of the future. Where will Philco, the industry leader, stand when Television is here for you to sell?

Since 1928, for sixteen years, Philco engineers have devoted millions of dollars to research in the field of television. More than any other research group, they have been responsible for constant improvement in the clarity, sharpness and detail of the television picture. Their pioneer contributions have helped to bring television to maturity, ready for rapid expansion after the war.

In this and many other directions, Philco has been in the forefront of the developments that make television a bright hope for the future to appliance dealers. And when it is ready to sell in your community, you can depend on Philco to fulfill the obligations of leadership.

PHILCO TELEVISION STATION WPTZ

Since 1933, Philco has owned and operated its own television station in Philadelphia, sending out studio programs and sports events direct from the scene. It has also rebroadcast programs from New York, establishing the technique upon which future television chains can be built. All this has been a rich laboratory of experience through which Philco engineers will help to make television, some day, a nationwide service.

PHILCO CORPORATION

Crosley Distributors Set for Buffalo, Fla., Central Nebraska

CINCINNATI — Three new distributors covering Buffalo, Florida, and central Nebraska and part of Kansas, have been appointed by Crosley Corp., announces J. H. Rasmussen, commercial manager.

The Florida franchise has been given to Graybar Electric Co., Inc., nationwide electrical distributor with 86 branches including a district office in Jacksonville, Fla., and Florida branches in Miami, Tampa, and Orlando. L. G. Fields heads Graybar's Florida operations.

Western Merchandise Distributors, Inc., headed by E. B. Ingraham, president, and Lee Wells, general manager, is the Crosley appointee in the Buffalo territory. Both Ingraham and Wells have been in the household appliance business for more than 20 years. The distributorship is located in the Little Bldg. at Franklin and W. Huron Sts. in Buffalo.

One of the larger wholesale distributors in the Middle West, the Dutton-Lainson Co. of Hastings, Neb. has been appointed distributor for Crosley in central Nebraska and part of Kansas. This firm, founded in 1886, has representatives traveling in six states and distributes wholesale hardware, automotive parts and electrical goods and supplies.

A special division of the company's distributing operation will be devoted exclusively to merchandising Crosley appliances and radios, it was announced. Dutton-Lainson Co. is headed by H. A. Lainson, president, who joined the firm in 1919.

Service Calls Registered To Provide Prospect List For Postwar

BELLEVUE, Pa. — Prospective postwar sales are being listed from service calls made daily by North Boro's Service, 568 Lincoln Ave.

Three months ago Office Manager T. A. Gordon began listing patrons using old refrigerators. List comprises, 1. patron's name, 2. make of refrigerator, 3. its approximate age, 4. patron's phone. After the war North Boro will begin a letter-telephone campaign, and salesmen will follow up.

With present coverage reduced from eight to three miles (except for "real old customers"), North Boro's "telephone technique" is to suggest that patrons beyond the three-mile limit consult the "refrigerator repairs" section of the phone book and select a suitable service shop.

N. Y. Furniture Group To Keep Salesmen 'On Tap'

NEW YORK CITY — Competent wholesale furniture salesmen will be kept "on tap," as it were, for furniture manufacturers, according to plans of the Furniture Manufacturers Representatives of New York, which is preparing a national advertising campaign to publicize its new service.

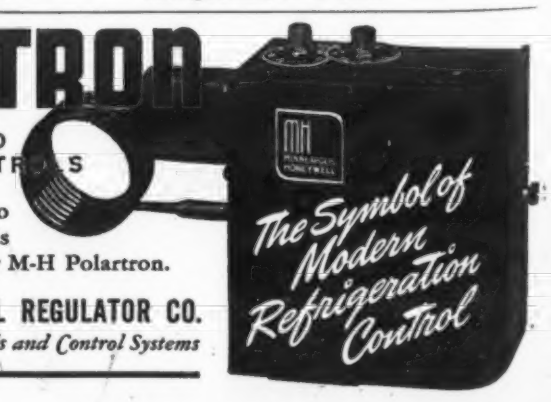
Manufacturers will be able to ask the organization for representatives and will obtain salesmen recommended on a basis of satisfactory background, it is said.

POLARTRON

PRESSURE AND TEMPERATURE CONTROLS

Extra features equivalent to 32 or more *Special* models are STANDARD in every M-H Polartron.

MINNEAPOLIS-HONEYWELL REGULATOR CO.
Refrigeration Controls and Control Systems



Camp Blanding Has Model Refrigeration Setup In Its Use of Both Large and Small Systems

Nearly 700 Units on Job Originally Planned For Ice; New Storage Room Hookup Has Staggered Load Control

CAMP BLANDING, Fla.—Nearly 700 refrigeration machines—679 fractional horsepower units and nine heavy duty compressors—are depended upon by the Army to preserve foods served to soldiers stationed at this vast training camp here.

It was recently revealed by the Chief Refrigerating Engineer at the camp that the Army's original plans called for mechanical refrigeration only in the large CS-3 warehouse, a 3-unit cold storage plant, to be centrally located on a railroad spur in the camp.

The many small storage units scattered throughout the camp and in the mess halls, where food would be kept immediately prior to use, were to be refrigerated by ice, in accordance with government instructions to employ all local facilities if possible.

When a survey showed that ice would have to be brought into camp by railroad cars from a point 50 miles away, Army engineers decided to employ mechanical cooling all along the line.

The 679 small units, ¼- and ⅓-hp. air cooled Carrier machines, which were installed on top of 45 and 65 cu. ft. cabinets in the kitchens, were supplied by Florida Weathermakers, Inc. of Jacksonville, Fla., who also supplied equipment for the large warehouse.

USE OF SELECTOR CONTROLS

Recently a $40,000 vegetable storage room was added to the No. 3 unit of the cold storage plant, and all three plants were remodeled to provide selector switch control instead of pressure control for the refrigeration equipment.

The cold storage plant has a capacity of 65,000 sq. ft. Each of the three units is powered by three compressors, two 50-hp. machines and one 40-hp. unit, each of which is connected to an evaporative condenser. The machines are controlled by Minneapolis-Honeywell thermostats and selector switches.

First compressor starts only when the refrigeration demand builds up beyond 25% of the possible total. A Hubbell capacity reduction valve on the compressor operates only when less than 30% of the total refrigeration need exists.

HOW UNITS CUT IN

Second compressor is cut in as the load goes over 50% of the total, with the capacity reduction valve operating when the refrigeration demand is below 80%. The third compressor apparently cuts in when the load tops 75%.

Wagner electric motors, controlled by Cutler-Hammer starter switches and relays, power and compressors in the cold storage plant. Dayton V-belts are used throughout the plant on compressor motors and cold diffuser fan motors.

No. 1 room in each of the three units comprising the plant is maintained at an average temperature of 10° F. for storage of meat and other frozen products. Four Carrier cold diffusers equipped with Alco magnetic solenoid valves and thermostatic expansion valves, and two M-H thermostat controls cool the No. 1 rooms.

No. 2 room in each unit is used principally as an issue room and is kept at an average temperature of 36° F. by two cold diffusers and one thermostat, as well as the cold diffuser valves.

No. 3 room is designed for storage of dairy products and is maintained at 30° F. by cold diffusers controlled by the thermostat in the No. 2 room. Two cold diffusers hold the temperature of the No. 4 room at 38° F. for egg storage.

Vegetables only will be stored in the new addition to cold storage plant No. 3, which is equipped with a cold diffuser, an M-H thermostat, and Detroit magnetic solenoid and thermostatic expansion valves.

The cold storage installation is manned by eight refrigeration experts, all residents of Florida. They are L. M. Johnston, superintendent of refrigeration, Green Cove Springs; J. G. Davidson, head operator, Lawtey; D. S. Rhoades, head operator, Starke; W. S. Bissell, operator, Starke; N. H. Prevatt, operator, Bronson; and J. W. Williard.

PURO ELECTRIC WATER COOLERS

Different models available for the various requirements of government agencies and war production plants.

PURO FILTER CORP.
440 Lafayette St., New York

DRINKING WATER SPECIALISTS FOR 40 YEARS.

Refrigerants have gone to war — are high on the list of vital materials. Don't let hidden leaks waste them.

VISOLEAK is composed of fine refrigerant oils colored and treated to penetrate every nook and cranny of the system, keeping a constant check for annoying, expensive hard-to-find leaks.

If refrigerant can leak out, so can *VISOLEAK* and it will mark the leak with a dark red stain.

VISOLEAK is safe—safe with any refrigerant and effective with systems of all types. It is non-toxic, non-poisonous, non-corrosive and non-inflammable.

VISOLEAK is economical—

Wholesale Prices		Save 10% on case lots
4 ounce bottle . .	$1.00	48 bottles
8 ounce bottle . .	1.75	24 bottles
1 pint bottle . . .	3.00	24 bottles
1 quart bottle . .	5.00	12 bottles
1 gallon can . . .	16.00	6 cans

See your jobber or write for complete information

WESTERN THERMAL EQUIPMENT COMPANY
5141 Angeles Vista Blvd. • Los Angeles 43, California

Please send me complete details about *VISOLEAK*.

Name_____

Address_____

★ ★ ★ ★ ★ ★ ★ ★

"Yes, Mr. Hitler"

The entire facilities of Schaefer Inc. are devoted to the production of war materials to bring about your early defeat. As soon as you and your kind are put out of the way we'll again make our contribution to better living here in America.

Americans will use the finest in mechanical refrigeration equipment when the name SCHAEFER is again put on - -

PAK-A-WAY FREEZERS
(HOME LOCKERS)

FARM FREEZERS

ICE CREAM CABINETS

FROSTED FOOD CABINETS

* * *

When it's new it comes from . . .

ESTABLISHED 1929..

Schaefer ..MINNEAPOLIS

INVEST IN VICTORY BY INVESTING IN WAR BONDS

Air Conditioning & REFRIGERATION NEWS

Trade Mark registered U. S. Patent Office;
Established 1926 and registered as
Electric Refrigeration News

F. M. COCKRELL, *Founder*

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Service Men May Return From Plants

IN the current drive to proselyte former refrigeration service men from war plants and get them back on the job where they can do America the most good, one new factor may operate to speed the process within the next few months.

It is the loss of overtime pay now being experienced by so many factory workers in certain localities.

Cutbacks of military production programs, plus continuing cancellations, are not only creating pools of unemployment here and there, but are reducing the hours-per-week worked in many factories.

Inasmuch as it has been that time-and-a-half overtime pay which has made the war plant jobs so attractive—rather than the base rates themselves — many former refrigeration repair men may soon discover that the gravy train has stopped running for them.

With the demand for refrigeration service so great and the supply of service men so small, nearly any mechanic who returns to the refrigeration service business should be able to make more money at his old trade than he now can at his new one. He will also, of course, have greater freedom.

In this connection the recruiters of refrigeration service men may find excellent prospects for training among other war plant workers who previously have not been identified with the refrigeration industry. Having the advantage of some mechanical experience, they should not be so difficult to train for refrigeration repair work as the average mine-run of applicants now found.

It cannot be said, of course, that all war production factories have suddenly gone on the 40-hour week. Some have, but most still work *some* overtime. The tendency is downward, however, and it probably will continue that way—particularly as more and more cost-plus contracts are replaced with fixed fee agreements.

By the beginning of summer, when needs for refrigeration repair work will begin to mount toward their annual peak, this slackening in the work week—and dimunition of the paycheck—in more and more factories will be noted.

Individual service firms are advised to watch the progress of this development carefully in their own communities. As soon as they discover that a plant is reducing its work week—or laying off men—they should be johnny-at-the-rat-hole with offers of work in the essential, well-paying field of refrigeration service.

With Selective Service tightening down tighter and tighter on occupational deferments, the industry's last remaining hope of continuing to keep its refrigeration systems in repair is the intensive recruiting of new men for the work.

Nothing we can do for our industry or our country would appear to be more important than the location and training of this additional manpower for refrigeration repair and maintenance work.

They'll Do It Every Time

By Jimmy Hatlo

WHEN OLD MAN BLUDGEON FINALLY RETIRED, ABOUT A YEAR AGO, THE JOY IN THE OFFICE WAS UNCONFINED —
AFTER 40 YEARS IN HARNESS I AM RETIRING AND TURNING OVER THE FIRM TO MY SON. I KNOW YOU WILL GIVE HIM THE SAME SUPPORT YOU HAVE SO LOYALLY GIVEN ME...
40 YEARS IN HARNESS, HORSEFEATHERS! 40 YEARS SWINGIN' THE WHIP HE MEANS...
THE OLD SIMON LEGREE! GOOD-BYE AND GOOD RIDDANCE!
HOORAY!
PRESIDENT
BUT THIS IS WAR, FOLKS, THIS IS WAR AND THERE AIN'T NO JOY TODAY—
I HAVE BEEN CALLED TO SERVE MY COUNTRY. I KNOW YOU WILL ALL BE DELIGHTED TO HEAR THAT MY FATHER HAS CONSENTED TO COME BACK AND TAKE OVER THE REINS IN MY ABSENCE..
SHERMAN WAS RIGHT!!
HAPPY DAYS ARE GONE AGAIN!
JIMMY HATLO
Thanx to J.M. RUSSAKOFF, NEW YORK, N.Y. 8-11
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LETTERS

THOUGHTS ON A 'BETTER REFRIGERATION INDUSTRY'

Fleetwood Distributing Co.
16 Elizabeth Ave.
Newark, N. J.

Editor:

Re: A better Refrigeration Industry.

I will endeavor to outline ways and means of strengthening the refrigeration industries' financial structure postwar to eliinate chiseling. I will try to be brief. However, I will be brutally frank. Therefore, I am going to list in order major weaknesses that will have to be corrected should this industry be sincere in helping the world in the future to stop war among mankind.

No. 1. There is an old axiom, as the leader goes the rest will go. The proof is the way this industry has been belittled by the various administrative boards in Washington, D. C. Right here I think it is the time to say that you, George F. Taubeneck, editor-publisher of the AIR CONDITIONING & REFRIGERATION NEWS have done more for the industry than any other element. It is absolutely imperative that the industry get together in one association, play the cards on top of the table face up, and from there on in the rest will be easy to correct, that I will now state.

No. 2. For many years the manufacturers have taken different angles in attempting to secure a volume of distribution.

No. 3. Inconsistent discounts. (Example: An individual without a business overhead could get as good a discount as a large business).

No. 4. Selling on a dollar down plan. (Discontinue).

No. 5. Consignment. (None).

No. 6. Manufacturers should not give chain stores better discounts than their distributors. Every piece of equipment should be sold through the distributor, dealer or contractor. If we are to eliminate W.P.A. and C.C.C. along with the rest of these non-employment organizations, we have got to stop by-passing the distributors.

No. 7. A horrible example, somewhat like what I have just mentioned was the manufacturers selling direct to the ice-cream companies, also the sale of frosted food cabinets. No sales profit made whatsoever, just to enable the marketing of frosted foods. In other words this equipment was footballed around, thus leaving many people out of employment.

No. 8. Here is a very vital bad root which has got to be stopped. The by-products companies that build butcher refrigeration equipment and give it to the merchant for manufacturing cost without a profit, most of the time at a loss, just so that they can get the by-products from these merchants. How on earth can anybody compete with this type of chiseling? This point holds good for every industry in America. We should not, cannot, tolerate a repetition of one big industry footballing the products of another industry at no profit, so that they in turn can merchandise their products for a good profit. A more concrete example of this has been the power companies selling electrical appliances below cost so as to create better consumption of power. All of this destroys the structure of employment and eventually demoralizes fair profits.

No. 9. We all know that the salesman has been exploited for years. To make a livelihood they were forced to become dishonest. They were brought to sales meetings once a week, high pressured and were turned loose like starving animals to feast upon the prey. When the end of the week drew near, these men with families would grow desperate to secure an order on any basis, promise a house with a fence around it to the consumer just so long as they got that order, so they could get a commission to get food for their family over the week-end. This should be eliminated, if there are right set-ups down the line. Salesmen should be paid a living wage plus commission, bonus and car expenses. They are the trench soldiers deserving of making money, and when they make it, it is proof that from them back up the line has also made money. This is then a healthy situation.

No. 10. We have the so-called little local manufacturers that build a few pieces of equipment a year. They can buy material at a maximum discount such as coils, compressors, etc. A large distributor doing a large volume of business cannot get these discuonts. This is unfair. These little fellows are the champion chiselers. They buy cheap. They sell cheap. Check their financial statements, that will prove they help no one not even themselves. Honest discounts should be awarded on one basis only, and it is on volume of business. This discount should be stepped up as the volume goes up retroactive. This will automatically put the organization, regardless of title in its proper bracket for right discount. In other words the organization would be making their own, depending upon their sales.

No. 11. All equipment sold to consumers should be honestly rated. True specifications as to construction and performance. The manufacturer should be as much interested in their products in the field, as the organization that represents them, who sold and installed it. Never again should there be permitted any Tom, Dick and Harry that could sell any piece of equipment be accepted by a manufacturer just because they made their few dollars in manufacturing profit. Warrantees and guarantees should be for only 90 days. They should be honestly written, eliminating the trick phraseology and catch clauses.

No. 12. I have many more important points to offer. However, by this time you will have gotten the gist of my thoughts. For the past 30 days all one hears is about postwar. Their conversations and talks are mere generalities, not touching on any concrete facts. Let each industry clean house of all the wrongs that they know have taken place in the past. When this is done, there should be one thought for all employ[illegible] How many people can we employ. Not how [illegible]. By so doing, industry will once more run government. Should they permit the government to set up graft and political agencies such as the W.P.A. everybody will have to continue with heavy taxes. The manufacturers down the line have got to have jobs for everybody thereby reducing federal taxes because the politicians that waste the people's money will be stopped. Government can never make industry. However, industry having all people employed can make a successful democratic country. In summation, let the refrigeration manufacturers once and for all join together, do away with the chiseling competition, employ all the people humanely possible, let the world have more competition among the politicians and we will have peace on earth for years to come.

No. 13. When the war ends all the refrigeration equipment in camps and other projects, should not be thrown on the market here in America. It should be all exported, otherwise the market will be demoralized right in the very start.

Here's hoping others will offer suggestions at their refrigeration meetings, to help our industry be a leader in America.

WALLACE W. LOWENSTEN

AUTHORITATIVE LOCKER INFORMATION

Minnesota Mining & Mfg. Co.
Saint Paul 6, Minn.

Editor:

I recently read "Refrigerated Locker Storage" by Phil B. Redeker.

One article that you mentioned was pertaining to the importance of humidity in locker storage. As you probably know, we are interested in different packaging problems and wonder if you have any pertinent information regarding the subject.

If you do not have this, it would be greatly appreciated if you would advise the writer where this information could be obtained. Thank you for any consideration given this request.

L. C. Dowrey, General Sales Dept.

Answer: This subject is covered rather thoroughly in a book on which we are acting as sales agents, and which we believe is the most authoritative text on the subject of frozen foods now available. The name of the book is: "The Freezing Preservation of Foods" —by Dr. Donald Tressler and W. F. Evers. The cost of the book is $8 per copy and is available from our Subscription Department.

The du Pont Cellophane Division has done a great deal of work on the humidity control and could undoubtedly be of help to you if their findings are available. Some of the refrigeration coil manufacturers, likewise, have studied the problem, and you might obtain information from them.

Inside Dope

By George F. Taubeneck

(Concluded from Page 1, Column 1)

quate refrigeration capacity was not built.

In view of these and other signposts, OPA men are said no longer to be contemplating additional rollbacks involving food subsidies.

Luftwaffe's Dilemma

If it is true that our recent air raids on the European continent have knocked out Nazi-controlled aircraft production to the point where they are no longer able to make full replacements for the planes our boys knock out of the sky, then the German Luftwaffe is faced with a terrible dilemma.

Either they must sit back and watch the progressive pulverization of their cities and their factories (in order to hoard a reserve of planes to meet the Invasion), or they must sacrifice their waning air strength in advance of the Invasion.

If the Nazis have little left in the way of air strength to oppose the Invasion forces, Eisenhower's task thus becomes much simpler. On the other hand, if they save an adequate air force for this Biggest Battle of All Time, there may not be one brick left standing on top of another in Naziland.

With the Americans and British pouring across the Channel while the Russians roll on toward Germany itself, with their cities and their homes in ruins, and with their allies deserting them in their hour of sorest trial, will the Nazis be able to rally the people they hold in thralldom for the final death struggle?

Although the war has been moving very slowly in Europe for many months, the arrival of good maneuvering weather may usher in a dizzy sequence of events.

Pacific War May Last Awhile

The enthusiastic optimism of the American people as expressed in the often-heard view that the Japs will fold up before the Nazis do is not shared by responsible groups in Washington.

It's a long, long way to Tokio, and the Japs are not logical people. Although every day that they postpone the final naval test means that our fleet increases its proportionate strength over theirs, the informed viewpoint is that they'll not risk a showdown until the last possible moment.

The war may last quite awhile—but it will likely come to a sudden, dramatic conclusion when the last chip is finally down.

Ice Cream's Future

With present milk production below expectations and future outlook none too favorable, the importance of each branch of the dairy industry comes under the closest public scrutiny.

In this connection, Dr. Tom G. Stitts, Chief of the Dairy & Poultry Branch, Food Distribution Administration, under whom all orders pertaining to wartime regulation of dairy products are administered has made the following statement:

"I have been asked many times if it would not be desirable to curtail the amount of milk solids which can be used in the manufacture of Ice Cream for civilian consumption below the present 65-percent limit.

"It is pointed out that other countries have cut out the production of Ice Cream entirely and thus saved a considerable quantity of milk for fluid use or for use in cheese and other products. The implication is that we should follow a similar if not quite so drastic procedure in this country.

"Quite apart from considerations of fairness to all members of the industry, which to me are always extremely important, and of the value to the dairy industry of having Ice Cream outlets especially in the heaviest production months, experience that we have gained so far indicates that any reasonable cut, 5 to 10 percent more, for instance, would gain little milk for other uses.

"I should like to point out, also, that countries which simply have stopped making ice cream were in far more desperate straits as regards milk and other food supplies than this country has been so far or seems likely to be in the future.

"Moreover, when this food emergency is over, the dairy industry will need to lean heavily upon the Ice Cream Industry to absorb milk solids.

"It is a distinct advantage to maintain the operations of ice cream manufacturers in order that they can expand and relieve the butter industry of the brunt of the load of plentiful milk supplies when they appear—which they are certain to do."

The ice cream industry is most valuable to the dairy farmer because of its ability to absorb large quantities of milk and cream during the warm months of peak milk production, thus assuring a market when the farmer needs it most.

A survey of the industry discloses that it pays for cream annually a premium of between 12 and 15 million dollars over Chicago butter quotations.

Both these aspects of ice cream manufacture are important to the millions of dairy farmers of the nation. Ice cream's future is economically assured, and manufacturers of ice cream cabinets know that when the war is over, they must start from scratch, because of its wholesale demanding of the field by hungry seekers after low-temperature cabinets.

Of all post-war refrigeration fields, the ice cream cabinet market looks relatively the most heartening.

War Spending

Here are some rough, but authentic figures on 1944 American business: Income payments should reach a record high of $150,000,000. Unemployment, the bugaboo of the last 10 years, will reappear in the second quarter, will grow politically acute in the third quarter of 1944. Retail trade, thanks to inventories and ingenuity, will touch $65,000,000 for the year, an all-time high.

Prices will not advance sharply, despite all the long-haired, informed predictions.

Demobilization

Demobilization will begin to be a major problem in 1944 notwithstanding continuation of the draft. It takes a long time to slow down a bureaucratic activity. Ordnance and ammunition plants are already hard-hit by cutbacks. Shipyards will come next.

Shift to consumers durable goods will come first in railroad items: locomotives, gondolas, refrigerator cars; then heavy-duty trucks. After that, farm machinery. Then. at long last, long-needed refrigerating machinery. Comes then refrigerated locker-storage, the low-temperature cabinets, then commercial refrigerating apparatus.

It's Time to Tell About Refrigeration's Hidden Services

UNSUNG HERO on the HOME FRONT...

The Refrigeration Service Engineer

WITH many of his co-workers in the armed forces, the refrigeration service engineer is working harder than ever before, willingly taking on the great task of keeping present refrigeration in operation.

▶ He's one of the "unsung heroes" of the home front. His experience and knowledge of every type of refrigeration and air conditioning installation provide a firm foundation for tomorrow's progress in the industry.

▶ If the *dependability* always built into A-P Refrigerant Valves has made his task easier, we, at A-P, are grateful. And we promise continued cooperation in the future.

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DEPENDABLE REFRIGERANT VALVES

Operating Characteristics of 'Freon-22'

Data From Kinetic Chemicals on Low Temperature Refrigerant

WILMINGTON, Del. — The properties of the refrigerant "Freon-22" and a comparison of its operating factors with those of other refrigerants have been outlined in a bulletin "Freon-22" prepared by R. J. Thompson and W. W. Rhodes of Kinetic Chemicals, Inc.

Following are some excerpts from this bulletin covering design and operating characteristics:

"Freon-22" is monochlorodifluoromethane, CHClF2, whose boiling point at 1 atmosphere is -41.44°F. It is a trade marked name of Kinetic Chemicals, Inc. for this flourine and chlorine substituted hydrocarbon.

TOXICITY

It is a non-toxic refrigerant classified by the Underwriters' Laboratories in Group 5A (see Underwriters' Laboratories Report MH-3134). In the presence of an open flame it has essentially the same characteristics as "Freon-12".

FLAMMABILITY

The Underwriters' Laboratories state on page 13 of MH-3134, under the caption "Results": "No propagation of flame was observed in the tests with difluoromonochloromethane even when the initial temperature of the vapor-air mixtures was raised to 100°C. (212°F.)" MH-3134 is available from the Underwriters' Laboratories or from Kinetic Chemicals, Inc.

WAR USE

During the war "Freon-22" has been used in reciprocating type compressors with auxiliary refrigerating apparatus to create low temperatures for the following purposes: calibration of thermometers and other temperature measuring devices; accelerated aging of steel for the production of precision tools and gages; cooling and storage of aluminum rivets, spars, and sheets; cooling of metal bushings for shrink fit; cooling the solutions in which high speed steel is quenched for maximum hardness and toughness; reduction of temperature of very volatile liquids in storage to prevent high vapor pressure; hardening of pitch to make it brittle and easily removable from lenses; processing of chemicals and pharmaceuticals and the tests of them; testing of airplane engines, instruments, hydraulic equipment, and accessories; cooling of brine circulated to welding tips; and the freezing and storage of blood plasma.

SUBSTITUTION

"Freon-22" is not a substitute for any other refrigerant and should not be mixed with any other refrigerant. It was created by the research laboratory of Kinetic Chemicals, Inc. to fulfill the need of refrigerating engineers for a refrigerant which could be used for low temperature refrigeration in simplified designs of equipment. "Freon-22" should only be employed in compressors designed for its use where, by its employment one can effect more efficient and advantageous operation, such as at those low temperatures where sufficiently low back or vapor pressures cannot be produced with higher boiling point and lower pressure refrigerants without complicated machine design.

METHOD OF OBTAINING LOW TEMPERATURES

Low temperatures are obtained in two ways:

(1) Operate a compressor employing a refrigerant such as "Freon-12" at low back pressure; i.e., causing the refrigerant to boil at a lower temperature than normal.

(2) Select a refrigerant such as "Freon-22", which has a lower boiling point than "Freon-12", so that the required low temperature may be obtained with a relatively high back pressure.

The penalty of low back pressure is, of course, the great loss of volumetric efficiency incurred in compressing a rarefied gas, and it is desirable in low temperature refrigeration to use a refrigerant of low boiling point, such as "Freon-22", in order that the back pressure be higher and the gas for compression be denser.

As an example, a reciprocating type compressor using "Freon-12", which produces a temperature of -40°F. within the evaporator, must handle the gas at a negative pressure of approximately 11 inches of mercury. The same compressor using "Freon-22", operating at the same temperature of -40°F. will handle the gas at approximately 1 pound gauge, or at the same back pressure of 11 inches a temperature of -58.5°F. will be obtained. Thus, it will readily be seen that lower temperatures can be obtained at the same back pressure without sacrificing volumetric efficiency or providing for increased compressor displacement when "Freon-22" is used.

REFRIGERATION TON COMPARISONS

In Table I will be found refrigeration ton comparative data of "Freon-22", "Freon-12", ammonia, and methyl chloride, with respect to the theoretical displacement of the compressor, quantities of liquid refrigerant to be vaporized, high and low side pressures of the system, temperatures of compression, etc. The values for the ton conditions (200 B.t.u. per minute) are for an evaporator temperature of -60° F. and a temperature of 80°F. in the saturated portion of the condenser, not providing for the superheat of vapor or the subcooling of the liquid refrigerant.

HEAD PRESSURES

At a temperature of 80°F. in the condenser the saturated pressure will be:

	Lbs. Per Sq. In. Gage	Decrease In Pressure Lbs. Per Sq. In.
"Freon-22"	145	0
Ammonia	138.3	6.7
"Freon-12"	84.6	60.4
Methyl Chloride ..	71.56	73.44

It is true that head pressures will be somewhat higher when using "Freon-22", but the pressures will be well within the safety limits of sturdy conventional construction.

(Continued on Page 19, Column 1)

Table 1—One Ton, 200 B.t.u. Per Minute

	"Freon-22"	Ammonia	"Freon-12"	Methyl Chloride
Chemical formula	$CHClF_2$	NH_3	CCl_2F_2	CH_3Cl
Molecular weight	86.48	17.03	120.9	50.48
Boiling Point -1 atm. °F.....	-41.44	-28.0	-21.6	-10.76
Melting Point °F.....	-256.0	-107.86	-252.0	-144
Critical Temperature °F.....	204.8	271.2	232.7	289.4
Critical Pressure— Lbs./sq. in. abs.	716	1651.0	582	968.7
Gage pressure Lbs./sq. in. 80° F.	145.0	138.3	84.06	71.56
Gage pressure Lbs./sq. in. -60° F.	*11.89	*18.6	*19.00	*22.19
Heat content—saturated vapor -60° F. B.t.u./lb.....	98.10	589.6	71.13	187.74
Heat content—liquid 80° F. B.t.u./lb.	34.09	132.0	26.28	44.36
B.t.u. refrig. effect per lb.	64.01	457.6	44.85	143.38
Lbs. of refrigerant per minute	3.125	.437	4.46	1.39
Cubic foot of liquid per lb. 80° F.	.0135	.02668	.0123	.01764
Cubic inches liquid refrigerant per minute	72.8	20.6	94.8	42.4
Cubic feet vapor per lb. -60° F.	5.452	44.73	6.516	22.09
Cubic feet piston displacement per minute	17.02	19.55	29.05	30.7
B.t.u. refrigeration per cubic foot displacement....	11.75	10.23	6.89	6.52
Compression Ratio	18.05	27.6	18.37	22.7
Temperature of compression °F.	185.7	385	120.1	294.6

*Inches mercury below atmosphere.

BUNDYWELD
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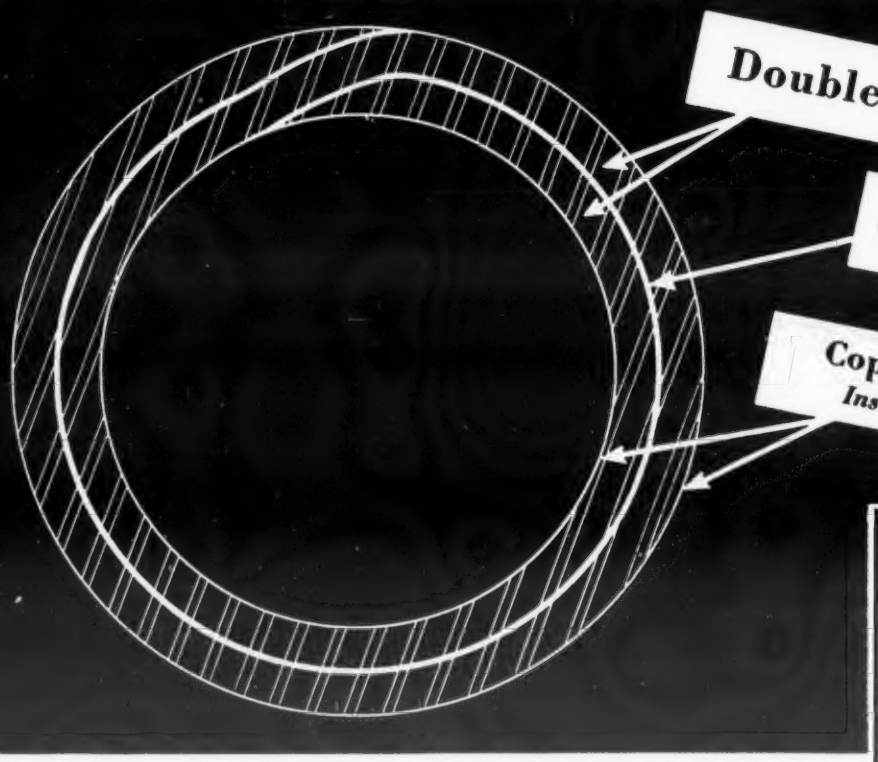

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GENERAL CHEMICALS DIVISION

'Freon-22' and Other Refrigerants Compared on Operating Factors

(Continued from Page 18, Column 5)

BACK PRESSURES

At a temperature of -60°F. the saturation pressure in the evaporator will be:

	Inches Mercury Vacuum	Lower Back Pressure Required In. Mercury	Lbs. Per Sq. In.
"Freon-22"	11.89	0	0
Ammonia	18.6	6.71	3.3
"Freon-12"	19.00	7.11	3.49
Methyl Chloride	22.19	10.30	5.03

It is this higher back pressure permitted by the use of "Freon-22" that accounts for the improvement in volumetric efficiency.

Under such temperature and pressure conditions, the compression ratio will be 18.05 to 1 for "Freon-22", 27.6 to 1 for ammonia, 18.37 to 1 for "Freon-12", and 22.7 to 1 for methyl chloride, making it advisable in certain cases to provide for two or three stages of compression.

In Table II will be found pressure-temperature relationships for the four refrigerants under comparison.

AMOUNT OF REFRIGERANT EVAPORATED

The refrigerating effect per pound of refrigerant evaporated will vary quite widely from one refrigerant to another, requiring the evaporation of more or less pounds of "Freon-22" per minute for the same refrigerating effect of comparison refrigerants. The values shown in the first three columns of the table below have only been set down for the purpose of deriving the values shown in the fourth column which should be used in determining line sizes and regulating valve orifice diameter.

There is a decided advantage in circulating large volumes of liquid refrigerant through the regulating valve orifice, as the greater volume required for the "Freon" refrigerants permits of less sensitive, more accurate, and more positive operating and regulating mechanisms with less critical adjustment. Refrigerants with high B.t.u. refrigerating effects are not desirable for the smaller commercial or industrial installations requiring close temperature control, due to the small volume of liquid refrigerant in the system and the difficulty encountered in accurately metering or regulating the flow of such small quantities of liquid through the orifice.

For the smaller installation the adjustment of the regulating valve orifice is most minute, for refrigerants with high B.t.u. values. "Freon-22" and "Freon-12" are both very desirable in this respect.

	B.t.u. Refrigerating Effect Per Pound	Pounds of Refrigerant Per Minute	Cu. Ft. Liquid Refrigerant Per Pound At 80° F.	Cubic Inches Refrigerant Evaporated Per Minute
"Freon-22"	64.01	3.125	.0135	72.8
Ammonia	457.6	.437	.02668	20.6
"Freon-12"	44.85	4.46	.0123	94.8
Methyl Chloride	143.38	1.39	.01764	42.4

COMPRESSOR DISPLACEMENT

The cubic foot displacement of the compressor per minute per refrigeration ton under the temperature and pressure conditions as shown in Table I are given below:

	Cubic Feet Piston Displacement Per Minute Required	Percent Greater Displacement Required	Percent Less Displacement Required When Using "Freon-22"
"Freon-22"	17.02	0	0
Ammonia	19.55	14.8	13
"Freon-12"	29.05	70.7	41.4
Methyl Chloride	30.7	80.4	44.5

Examination of the values in the above tabulation discloses the fact that when using "Freon-22" in existing equipment, it will be possible to either increase the refrigeration capacity of a "Freon-12" compressor approximately 71% with the same bore, stroke, and speed, or to maintain the same refrigeration capacity by reducing the speed of the "Freon-22"-charged "Freon-12" compressor approximately 44½%. Obviously, if the same bore, stroke, and speed are used with a "Freon-22" compressor, a larger condenser and motor will be required to take care of the resulting higher refrigeration capacity.

LUBRICATION

One very important consideration that must be given to the designing of "Freon-22" refrigeration equipment for extremely low temperature work, is the selection of the lubricant and two points will be briefly pointed out.

(1) "Freon-22" and mineral lubricating oil are miscible in the high side of the system, but will produce a two-layer system in the evaporator dependent upon temperature, percent oil in the liquid "Freon-22", and the particular oil used in the system. The critical solution temperature will increase with increasing viscosity and molecular weight of the mineral lubricating oil. When oil separates from "Freon-22", the oil will float on top of the liquid refrigerant in the evaporator in the same manner that oil floats on top of liquid sulphur dioxide.

Of the widely used and commercially available refrigeration grade oils, varying in viscosity from 100 to 317 seconds, it was found that the critical solution, or oil separation temperatures varied from 5°F. to 10°F. with 1% oil in the liquid "Freon-22", and with these same oils the separation temperature was moved up to the range of 19°F. to 64°F. with 10% oil in the liquid "Freon-22".

(2) Certain refrigerants such as methyl chloride, ethyl chloride, di-

(Concluded on Page 20, Column 1)

Table II—Saturated Vapor Pressure Pounds Per Sq. In. Gage

	"Freon-22"	Ammonia	"Freon-12"	Methyl Chloride
-150	* 29.4		* 29.6	
-140	* 29.0		* 29.4	
-130	* 28.5		* 29.1	
-120	* 27.7		* 28.6	
-110	* 26.6		* 27.9	
-100	* 25.1	* 27.4	* 27.0	
- 90	* 23.0	* 26.1	* 25.7	
- 80	* 20.2	* 24.3	* 24.1	* 25.9
- 70	* 16.6	* 21.9	* 21.8	* 24.3
- 60	* 11.9	* 18.6	* 19.0	* 22.2
- 50	* 6.0	* 14.3	* 15.4	* 19.4
- 40	0.6	* 8.7	* 11.0	* 15.9
- 30	5.0	* 1.6	* 5.5	* 11.5
- 20	10.3	3.6	0.6	* 6.1
- 10	16.6	9.0	4.5	0.3
0	24.2	15.7	9.2	4.2
10	33.0	23.8	14.7	8.9
20	43.3	33.5	21.1	14.5
30	55.3	45.0	28.5	21.0
40	69.0	58.6	37.0	28.6
50	84.7	74.5	46.7	37.3
60	102.5	92.9	57.7	47.3
70	122.5	114.1	70.1	58.7
80	145.0	138.3	84.1	71.6
90	170.1	165.9	99.6	86.0
100	197.9	197.2	116.9	102.0
110	228.7	232.3	136.0	119.8
120	262.6	271.7	157.1	139.5
Freezing point °F.	-256.0	-107.86	-252.0	-144.0

*Inches of mercury below one atmosphere.

ARMY E NAVY

PREMIUM for PRECISION

M. & E. split-hair precision in ordnance production enables split-second firing on the battle front. The manufacturing principles involved in producing ordnance — in which a premium is placed on precision — are a natural follow through on the old established M. & E. practice in compressor construction. M. & E. postwar compressors will again reflect this quality craftsmanship.

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Up to 120 tons capacity

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AMINCO

OIL SEPARATORS

protect Coils, Condensers, Compressors, Valves and Dehydrators by picking oil out of the refrigerant stream and AUTOMATICALLY returning this oil to its proper place, the crankcase.

Now that replacements are hard, almost impossible to get, those charged with the responsibility of maintaining existing equipment are looking for longer operative life and reduced operating costs.

Aminco Oil Separators protect compressors by maintaining correct oil level in crankcase and by excluding oil from refrigerant stream they enable coils, condensers, valves and dehydrators to function most efficiently.

These oil separators are made for jobs from ¼ H.P. to 120 tons and are used everywhere, ashore or afloat, where efficient refrigeration is desired.

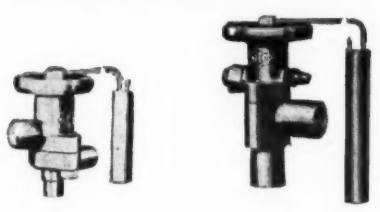
Full descriptive bulletins on request.

AMERICAN INJECTOR CO.

Pacific Coast—Van D. Clothier, 1015 E. 16th, Los Angeles
Export: Borg-Warner International Corp.,
310 S. Michigan Ave., Chicago, Ill.

Again—Alco Has the *COMPLETE* Line
This Time Designed Especially for Naval and Marine Use

Thermostatic Expansion Valves for Navy and Maritime Service



Solenoid Valves for Navy and Maritime Service

Evaporator Pressure Regulators for Navy and Maritime Service

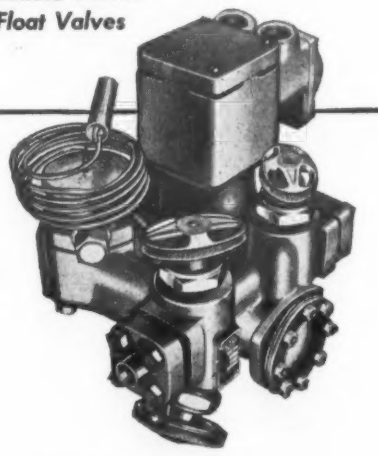
The proved advantages of Alco's standard valve design were readily adaptable to these special valves to meet the exacting requirements of Navy and Marine service.

These advantages, such as atomic hydrogen welding, easy servicing, and sturdy construction, available in our standard valves, are equally valuable for normal civilian requirements.

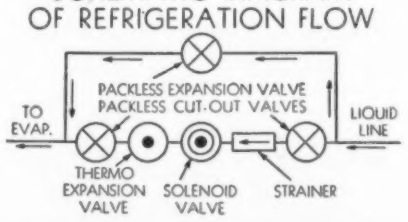
ALCO

Designers and Manufacturers of
Thermostatic Expansion Valves
Pressure Regulating Valves
Solenoid Valves
Float Valves

Control Valve Manifold for Navy and Maritime Service



SCHEMATIC DIAGRAM OF REFRIGERATION FLOW



ALCO VALVE COMPANY—853 Kingsland Avenue, St. Louis, Missouri

Design, Operating, Handling Factors For 'Freon-22'

(Concluded from Page 19, Column 3)

chloromethane, and the "Freon" fluorine refrigerants have the characteristic of acting as solvent refining agents of oil, and cause the inherently waxy compound to separate as crystalline or amorphous waxes. Much data on the subject appears in Refrigerating Engineering of July, 1942, by Dr. E. S. Ross, the A.S.R.E. 1942 Data Book, and "Modern Methods of Refining Lubricating Oils", by Dr. V. A. Kalichevsky.

In studying the separation of waxes from refrigerant-oil mixtures, we have found that the cloud point or start of wax separation varied from -62°F. to 14°F. with 1% oil in the liquid "Freon-22", and from 14°F. to as high as 57°F. with 10% oil in the liquid "Freon-22".

It was also found that the pour point of the dewaxed oil, saturated with "Freon-22" was lowered (-60°F. to -100°F.) far below the original pour point (-20°F. to -45°F.) and to temperatures below any temperature the refrigerant might be called upon to produce.

The extent to which the "wax separation temperature" of the oil will be raised will depend upon the percent oil in solution with the liquid refrigerant, base and type of oil, viscosity, method of refining, dewaxing process used, and other factors.

Should oil separation, wax separation, and accumulation of wax at the low temperatures required be experienced, there are three solutions that may be followed to correct such difficulties:

(1) Use an oil as low in viscosity as is practical for satisfactory compressor operation.

(2) Use an oil which has been dewaxed or degummed at a sufficiently low temperature so that any remaining wax will not be precipitated out of the oil at the lowest operating temperature, when the oil is in solution with liquid "Freon-22".

(3) Install an oil separator between the compressor and the condenser and as close to the cylinder head as possible, so as to prevent the oil containing wax passing through the condenser, receiver, liquid line, expansion valve, and into the low temperature exaporator.

In Table III will be found certain data collected on oil separation temperatures, wax separation temperatures, and the pour point temperatures of oils saturated with "Freon-22".

DESIGN FACTORS

From the foregoing, it will be found that careful consideration must be given to compressor displacement to prevent overloading of motor and condenser, size of regulating valve orifice, calibration of pressure control devices, lubrication and selection of lubricating oil, compression ratio, size liquid and suction line, heat exchangers, oil coolers, etc. Advice or recommendations on changes to existing equipment should be obtained from the manufacturer of the particular compressor and refrigerating equipment.

Table III

	Oil								
	E	F	M	N	B	D	G	O	Q
Viscosity at 100° F.....	160	158	290	297	100	153	198	317	190
Pour point °F.....	-45	-45	-25	-35	-40	-35	-30	-20	-40
Cloud point °F.....	-50	-50	-50	-50	....	....	....	....	5
Oil Separation (Critical solution temperature)									
1% Oil in "Freon-22".....	9	9	9	7	....	....	....	....	....
10% Oil in "Freon-22".....	19	23	43	41	25	46	57	64	....
Cloud Point (Start of wax separation)									
1% Oil in "Freon-22".....	-29	-62	-22	-45	-29	-13	0	14	-35
2% Oil in "Freon-22".....	....	....	....	....	....	....	....	....	-22
10% Oil in "Freon-22".....	19	....	....	....	14	28	43	57	....
Pour Point of Oil Saturated with "Freon-22"									
°F.....	-100	-100	-85	-95	-85	-60	-65	-60	....

STABILITY

"Freon-22" has substantially the same chemical stability, non-corrosive properties, and solvent action in regard to construction materials as does other of the "Freon" refrigerants, through the range of temperatures found in refrigerating systems. Thus, no war critical materials are required.

SOLUBILITY OF WATER IN "FREON-22"

The solubility of water in "Freon-22" is approximately eight times higher than the solubility of water in "Freon-12". Thus, there should be no separation of water from "Freon-22" at temperatures as low as -112°F., providing, of course, that the "Freon-22" does not contain more than .0025% moisture by weight, which is the maximum contained in "Freon-22" when obtained from the manufacturer.

ODOR

"Freon-22 vapor is odorless at concentrations of less than 20% by volume in air, which is equivalent to the release and vaporization of approximately 46 pounds of liquid into a confined space of 1,000 cubic feet. At concentrations higher than 20% by volume in air, the odor of "Freon-22" vapor is very mild and somewhat ethereal, being similar to carbon tetrachloride, the commonly used fire extinguisher fluid.

PRECAUTIONS WHEN HANDLING "FREON-22"

"Freon-22" vapors in all concentrations are non-irritating to the eyes, nose, throat, lungs, or skin. Gas masks or refrigerant absorbent materials are not required when handling "Freon-22", or any other "Freon" refrigerant.

It is essential that proper protection be afforded the eyes by the use of goggles or large lens spectacles, to eliminate the possibility of liquid "Freon-22" coming in contact with the eyes, and causing possible injury due to the freezing of the moisture in the eyes.

Should "Freon-22" come in contact with the eyes, the person suffering the injury should be taken at once to a good eye specialist. Avoid rubbing or irritating the eyes and give the following first aid treatment immediately:

(1) Drops of sterile mineral oil should be introduced into the eyes as an irrigant.

(2) The eyes should then be washed if the irritation continues at all, with one of the following:

(a) a weak boric acid solution

(b) a sterile salt solution not to exceed 2% sodium chloride.

Should liquid "Freon-22" come in contact with the skin, the injury should be treated the same as though the skin had been frostbitten or frozen.

LEAKS

A leak of "Freon-22" vapor can be definitely located by means of a Halide torch or lamp, by the same method used for other of the "Freon" fluorine refrigerants.

VISCOSITY

Data on viscosity of "Freon-22" vapor and liquid will be found in Refrigerating Engineering of April, 1939, pages 243 to 247, inclusive.

THERMAL CONDUCTANCES

Thermal conductances and heat transfer coefficients of "Freon-22" will be found in Refrigerating Engineering of Febraury, 1943, pages 95 to 99, inclusive.

CRITICAL POINTS

It will be observed in Table I that "Freon-22" has a critical temperature and pressure well above any temperature or pressure that may be experienced in practice. Also, that "Freon-22" has a freezing point or temperature of solidification way below the freezing point of ammonia and methyl chloride.

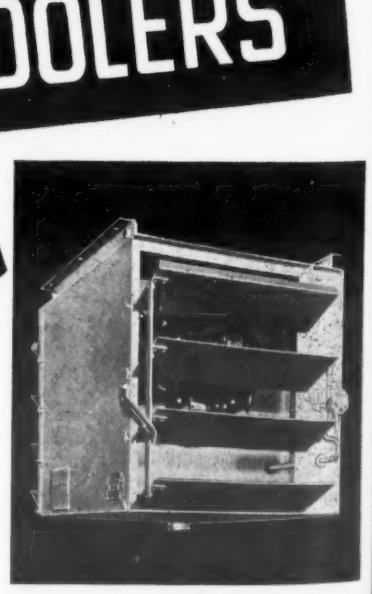
So This Grumman "Hellcat"
Can "Go Upstairs Faster" and Fight at High Altitudes
. . . the intercooler of the supercharger of each ship requires several hundred pieces of oval aluminum tube such as illustrated below . . . made to precise specifications by Wolverine.
WOLVERINE
TUBE DIVISION
CALUMET & HECLA CONSOLIDATED COPPER CO. 1411 CENTRAL AVE. • DETROIT 9, MICH.
In Canada: UNIFIN TUBE CO., LONDON, ONT.

KRAMER
Low Temperature
UNIT COOLERS

FREEZING OVEN
Electrical Defrost

THE FREEZING OVEN is a low temperature unit cooler with a self-contained electrical defrost mechanism. The complete unit is housed in an insulated shell with insulated front and rear adjustment louvers.

SPECIFICATIONS: All copper KRAMER coil, 5/8" tube, 1/2" fin spacing, fin sweated to tube. An electrical heater of suitable wattage, suction line hand valve mounted on shell shunted by a relief valve. Insulated steel housing, insulated adjustable front and rear louvers, specially designed silent fan driven by totally enclosed fan duty motor of proper capacity designed for continuous operation.



FOR LOW TEMPERATURES
(Below 32°)

FREEZING SHOWER
Water Defrost

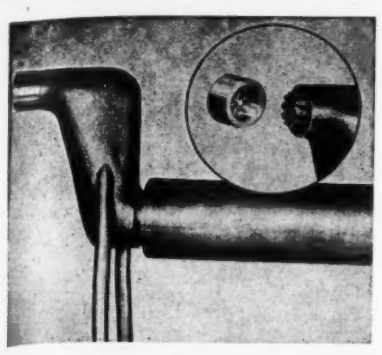
THE KRAMER FREEZING SHOWER offers a low temperature unit using a water shower of ordinary tap water to defrost. It can be completely defrosted in a few minutes without effecting the temperature of the box, simple to install and operate.

Send for descriptive Folders on the KRAMER FREEZING OVEN and the KRAMER FREEZING SHOWER.

MATE TO THE FREEZING OVEN

KRAMER-TRENTON CO. Trenton, N.J.
Heat Transfer Products

Welders Can Cool New Offset Electrode Tip



Small tubes which carry coolant to the tip of this offset welding electrode "bypass" the "knee," permitting a solid cross section at the point of greatest stress.

* * *

DETROIT—The first offset spot welding electrode which can be effectively cooled at its tip is claimed by Frostrode Products Co. here. Large numbers of this new type of electrode are already being used in the fabrication of aircraft subassemblies, it is said.

It was very difficult to provide efficient electrode cooling, it is claimed, when spot welding in such hard-to-get-at positions as spots close to flanges, etc., since internal water passages could not be extended to the tip without dangerously weakening the "knee" which the offset type of electrode requires. Maximum strength in the Frostrode, offset electrode is retained by having a "solid" cross section at the point of greatest stress. The cooling liquid enters the Frostrode offset electrode below the knee and thence flows through the coolant guide into the finned, replaceable "Frostcap" which forms the electrode's tip.

The function of the coolant guide is to concentrate the cooling action of the fluid where it will do the most good—at the very tip of the electrode. A controlled flow of the cooling medium circulates through the finned cap and then back through the flutes which have been machined into the outer diameter of the coolant guide and so on out of the electrode, below the knee.

The new offset electrode is adaptable to any standard electrode holder. It is available with either a ⅝-inch, ¾-inch, or a ⅞-inch O.D. replaceable Frostcap of hard drawn copper for high conductivity or Mallory 3 Metal for high hardness. The shank may have a No. 2 or larger Morse taper.

$40,000 Cold Storage Started in Vancouver

VANCOUVER, B. C., Canada—Edmunds and Walker, Ltd., Vancouver, has commenced the erection of a new ice and cold storage unit at their Vancouver plant at a cost of approximately $40,000. McCarter and Nairne, Marine Bldg., Vancouver, B. C. are the architects in charge of the job.

Project comprises the erection of a two-story building of heavy frame construction measuring 91 by 48 feet, to be situated on pile foundations. Structure will contain freezing rooms, storage and refrigerator space and ice bunkers.

HERE IT IS WILL BE READY APRIL 15 NEW CATALOG

ANNOUNCING NEW LINE WASHING MACHINE PARTS AND SUPPLIES

MOTOR PARTS
DELCO—SUNLIGHT
WAGNER
REFRIGERATION
PARTS AND SUPPLIES
100% WHOLESALE

REFRIGERATION
HERMETIC REBUILDING
GRUNOW—MAJESTIC
GENERAL ELECTRIC
WESTINGHOUSE

SERVICE PARTS CO.
2311 Lake St. Melrose Park, Ill.

Cylinder Shortage Hits Ammonia Distribution

WILMINGTON, Del. — The acute shortage of steel cylinders for shipping is threatening to bottleneck the flow of ammonia, it was revealed last week.

Warning that the situation is becoming critical was contained in an appeal by the National Ammonia Division of E. I. du Pont de Nemours & Co. to industrial consumers to empty and return the cylinders in which they receive ammonia promptly.

Cylinder manufacturers right now are hard pressed making torpedo housings, bombs, shells and other war materials.

"We are experiencing a most critical cylinder shortage," the letter from the Ammonia Division said.

"Furnishing ammonia for the treatment of metals going into tanks, airplane parts, armor-plate, armor piercing shells and cold storages for the government, has taxed our cylinder equipment to the utmost."

H. J. Scaife Heads Hotpoint Kitchens

CHICAGO—H. J. Scaife, Hotpoint factory branch manager at Buffalo, N. Y., has been named manager, Kitchen Sales Division, of Edison General Electric Appliance Co., Inc., G. H. Smith, general sales manager, has announced. Mr. Scaife returns to Chicago after two years at the Buffalo branch.

75 Freezers Will Supply Ice Cream for the AEF

SOMEWHERE IN ENGLAND — Seventy-five large ice cream freezers with a capacity of 1,350 gallons an hour have been shipped from the United States for installation in Post Exchanges of U. S. Army camps here, and installations are scheduled later in other European theaters of war. Accompanying the freezers are cabinets, dry mix, flavors, and syrups.

Dugas to Head Frick's Washington, D. C. Office

WASHINGTON, D. C. — W. J. Dugas has been appointed branch manager of Frick Co.'s Maryland-Virginia-District of Columbia territory and will make his headquarters in the area office at 1232 Shoreham Bldg. here.

An office is also maintained by the company in Baltimore at 2133 Maryland Ave.

Mr. Dugas has been with Frick 18 years. He completed an extensive training course including shop, field erecting, engineering, and estimating work before serving 30 months in the company's branch office at Philadelphia.

He then moved to Albany, N. Y. to open a new branch there. In September of 1941 he was selected to establish the Washington office of the company.

Mr. Dugas received his engineering training at Southwestern College, Lafayette, La., from which he was graduated in 1926.

6 Egg Freezing Plants Planned For Ontario

LONDON, Ont., Canada—Six plants for breaking and freezing eggs are to be opened to alleviate a storage shortage caused by the heavy production of eggs in Western Ontario, the poultry and marketing division of the Dominion Department of Agriculture in London announced Feb. 23. Plants will be located at London, Brantford, Walkerton, Grand Valley, Harriston and Teeswater.

At these plants, the eggs are broken and the whites and yolks mixed and poured into 30 to 40 pound forms and frozen in freezers at 5 to 10 degrees below zero. This so-called melange is to be held in storage until such time as the large volume of fresh eggs commences to decrease. Then the melange will be shipped to powdering plants, defrosted and powdered for shipment to Britain.

Agriculture department officials say there is no danger of production exceeding requirements.

Plan Now
– to be a successful Distributor of Savage Frozen Food Cabinets

The distributor who will *start now* to plan his future operations in the frozen food field will be in the best position to profit from this large and waiting market.

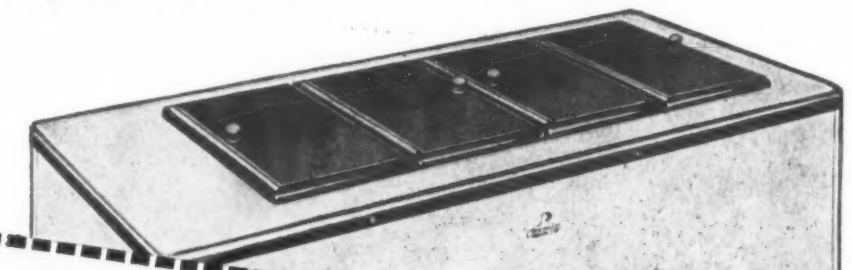
Savage Frozen Food Cabinets will be ready for you when production is permitted. Note these advantages in the Savage line:

1. *Dependability:*
   With long experience in the design and manufacture of low temperature ice cream cabinets . . . Savage has the engineering ability and manufacturing skill essential to dependable performance and customer satisfaction.
2. *A Good Name:*
   Well known—a name in which the prospective buyer will have confidence.
3. *High Values:*
   Result of manufacturing experience and extensive modern production facilities.
4. *Merchandising Cooperation:*
   Assistance in distribution will be generously offered.
5. *Dependable Source:*
   Savage with fifty years of experience in giving satisfaction to its customers assures its prospective distributors of this same splendid service.

Agencies now open for consideration

Inquiries are invited from distributors interested in building a stable and successful business. Fill in the attached coupon or address:

Dept. 4, Savage Arms Corporation, Utica, N.Y.



SAVAGE
Frozen Food
CABINETS

SAVAGE ARMS CORPORATION, Dept. 4, UTICA, N.Y.
I am interested in the future distribution of Savage Frozen Food Cabinets. I would like to investigate the prospects of a future relationship.
Name.....
Firm Name.....
Address.....
.....

Task Committee Report on Refrigeration Requirements In Places Handling Food

Data on Institutions and Hospitals

Editor's Note: This is another part of the report by the Task Committee of the General Refrigeration Industry Advisory Committee on requirements for domestic civilian food processing, preservation, and storage. (First part published by the NEWS was in the Feb. 28 issue.)

Parts of the report being published by the NEWS are those showing number of establishments utilizing refrigerating equipment by various branches of the food handling fields, type and extent of equipment in such establishments, overall value, and the estimated life and normal replacement rate.

This report probably is the most comprehensive picture yet drawn of the broad use of mechanical refrigeration in food handling establishments.

Hospitals, Hotels, And Institutions

Statistics furnished the committee by the War Production Board, which figures are based on the 1939 Census of Manufactures, reveal the number of establishments under this classification, subdivided by types of business and product handled and including average annual sales volume. No statistics are available to indicate what percentage of the total utilize refrigeration equipment nor the size or quantity of refrigeration equipment so utilized.

The committee studied each subclassification and estimated from their experience the percentage of the total having refrigeration equipment and the type of refrigeration equipment installed in the typical average establishment. The exact treatment given each subclassification is as indicated hereinafter.

Establishments under this classification were treated in several different subclassifications, as follows:

(a) County homes.
(b) Schools (with cafeterias).
(c) Aged homes.
(d) Colleges and universities.
  (1) Over 2,000 students.
  (2) 500 to 2,000 students.
  (3) Under 500 students.
(e) Penitentiaries.
  (1) Over 1,000 inmates.
  (2) 500 to 1,000 inmates.
  (3) 250 to 500 inmates.
  (4) Under 250 inmates.
(f) State prisons and corrective institutions.
(g) Hospitals.
  (1) Over 300 beds.
  (2) 200 to 300 beds.
  (3) 100 to 200 beds.
  (4) Under 100 beds.
  (5) Veterans, over 300 beds.
(h) Hotels.
  (1) Over $300,000 food sales.
  (2) $100,000 to $300,000 sales.
  (3) $20,000 to $100,000 food sales.
  (4) $10,000 to $20,000 food sales.
  (5) Under $10,000 food sales.
(i) Golf and country clubs.
(j) YMCA and social clubs.

(a) COUNTY HOMES

Statistics reveal 3,000 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipment installed in such establishments and the percentage of the total having such refrigeration, in accordance with the following:

80%—1—reach-in refrigerator with one ⅓-hp. condensing unit.

Based on present-day prevailing prices, the average manufacturer's price for such equipment is $378,000 for the total 3,000 establishments.

The average life of such equipment is estimated at 12½ years and the normal replacement rate at 8% per annum.

(b) SCHOOLS (WITH CAFETERIAS)

Statistics reveal 51,000 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipment installed in such establishments and the percentage of the total having such refrigeration, in accordance with the following:

(1) 17,000 schools—100%—one 20 cu. ft. refrigerator with one ¼-hp. condensing unit.

(2) 17,000 schools—100%—one 30 cu. ft. refrigerator with one ⅓-hp. condensing unit.

(3) 17,000 schools—100%—one 80 cu. ft. refrigerator with one ½-hp. condensing unit.

Based on present-day prevailing prices, the average manufacturer's price for such equipment is $8,240,000 for the total 51,000 establishments.

The average life of such equipment is estimated at 12½ years and the normal replacement rate at 8% per annum.

(c) AGED HOMES

Statistics reveal 1,428 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipment installed in such establishments and the percentage of the total having such refrigeration, in accordance with the following:

50%—1—reach-in refrigerator with one ¼-hp. condensing unit.

Based on present-day prevailing prices, the average manufacturer's price for such equipment is $94,500 for the total 1,428 establishments.

The average life of such equipment is estimated at 12½ years and the normal replacement rate at 8% per annum.

(d) COLLEGES AND UNIVERSITIES

Establishments under this classification were treated under several different subclassifications, as follows:

(1) OVER 2,000 STUDENTS

Statistics reveal 144 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipment installed in such establishments and the percentage of the total having such refrigeration, in accordance with the following:

90% — 10 — reach-in refrigerators with five ½-hp. condensing units.

80% — 6 — walk-in coolers with three 2-hp. condensing units.

80% — 3 — mechanical-type water coolers with three 1-hp. condensing units.

75%—1—soda fountain with one 1-hp. condensing unit.

75%—2—ice cream cabinets with two ⅓-hp. condensing units.

Based on present-day prevailing prices, the average manufacturer's price for such equipment is $493,100 for the total 144 establishments.

The average life of such equipment is estimated at 12½ years and the normal replacement rate at 8% per annum.

(2) 500 TO 2,000 STUDENTS

Statistics reveal 455 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipment installed in such establishments and the percentage of the total having such refrigeration, in accordance with the following:

90% — 6 — reach-in refrigerators with three ½-hp. condensing units.

80%—4—walk-in coolers with two 1½-hp. condensing units.

75% — 1 — mechanical-type water cooler with one 1-hp. condensing unit.

60%—1—soda fountain with one 1-hp. condensing unit.

75%—1—ice cream cabinet with one ⅓-hp. condensing unit.

Based on present-day prevailing prices, the average manufacturer's price for such equipment is $816,500 for the total 455 establishments.

The average life of such equipment is estimated at 12½ years and the normal replacement rate at 8% per annum.

(3) UNDER 500 STUDENTS

Statistics reveal 100 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipment installed in such establishments and the percentage of the total having such refrigeration, in accordance

(Continued on Page 23, Column 1)

Artic
(DU PONT METHYL CHLORIDE)
DU PONT
SERVICE NEWS
WAR-TIME NEWS LETTER

Dear Sir:

Lately, we have had a few requests about the right kind of lubricating oil to use with Methyl Chloride. Of course, any kind of oil won't do. Each refrigerant offers a different lubrication problem.

Quite a few oil companies can supply suitable oils, specifically designed for use with Methyl Chloride. Good results have been obtained with mineral oils which conform to the following:

Viscosity.....150-330 seconds Saybolt at 100°F.
Moisture Content.....Less than 0.01% by weight
Pour Point.....-10°F. or below
Acidity.....Neutral-acid equivalent to not more than 0.01 mg. KOH per gm. oil
Flash Point.....320°F. minimum
Saponifiable Matter.....None
Sulfur Content.....Less than 0.15%
Sligh Oxidation Number.....Less than 10
Copper Solubility.....None under test conditions

Good rules to follow: Don't use oils which have not been tested and found suitable for the particular equipment. Wherever possible, use the oil recommended by the machine manufacturer.

Don't blame the lubricant entirely for poor performance. Faulty gasket material and moisture are common causes of trouble ... can break down refrigerant and oil, cause corrosion and copper plating. Eliminate these suspicious features first.

Very truly yours,
Thomas Coyle
THOMAS COYLE
Manager, Chlorine Products Division

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Air Conditioning FOR TOMORROW

NIBCO WROT
FITTINGS AND TUBULAR PARTS

NIBCO Fittings are so accurately made that they save substantial sums in assembly costs. Specially designed equipment and a unique patented process make NIBCO WROT Fittings absolutely "round and square" and easy to align. Individual inspection with plug gauge tests of every item eliminates all guesswork. More than 1,000 standard fittings and other items are shown in our Air Conditioning and Refrigeration Catalog. We also welcome your inquiries for special tubular or cast parts. Remember Nibco in your post-war planning.

NORTHERN INDIANA BRASS CO.
ELKHART, INDIANA
VALVES AND FITTINGS SINCE 1904

Refrigeration Requirements For All Types of Institutions

(Continued from Page 22, Column 5)

with the following:

80%—1—reach-in refrigerator with one ⅓-hp. condensing unit.

80%—1—walk-in cooler with one ¾-hp. condensing unit.

Based on present-day prevailing prices, the average manufacturer's price for such equipment is $22,400 for the total 100 establishments.

The average life of such equipment is estimated at 12½ years and the normal replacement rate at 8% per annum.

(e) PENITENTIARIES

Establishments under this classification were treated under several different subclassifications, as follows:

(1) OVER 1,000 INMATES

Statistics reveal 65 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipment installed in such establishments and the percentage of the total having such refrigeration, in accordance with the following:

90% — 6 — reach-in refrigerators with three ½-hp. condensing units.

90%—8—walk-in coolers with four 3-hp. condensing units.

80% — 4 — mechanical-type water coolers with four 1½-hp. condensing units.

75%—1—ice maker with one 2-hp. condensing unit.

75%—3—ice cream cabinets with three ⅓-hp. condensing units.

Based on present-day prevailing prices, the average manufacturer's price for such equipment is $380,450 for the total 65 establishments.

The average life of such equipment is estimated at 12½ years and the normal replacement rate at 8% per annum.

(2) 500 TO 1,000 INMATES

Statistics reveal 52 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipment installed in such establishments and the percentage of the total having such refrigeration, in accordance with the following:

90% — 4 — reach-in refrigerators with two ½-hp. condensing units.

90% — 6 — walk-in coolers with three 2-hp. condensing units.

80% — 3 — mechanical-type water coolers with three 1-hp. condensing units.

75%—1—ice maker with one 1½-hp. condensing unit.

75%—2—ice cream cabinets with two ⅓-hp. condensing units.

Based on present-day prevailing prices, the average manufacturer's price for such equipment is $168,750 for the total 52 establishments.

The average life of such equipment is estimated at 12½ years and the normal replacement rate at 8% per annum.

(3 250 TO 500 INMATES

Statistics reveal 65 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipment installed in such establishments and the percentage of the total having such refrigeration, in accordance with the following:

90% — 3 — reach-in refrigerators with three ⅓-hp. condensing units.

90%—4—walk-in coolers with two 2-hp. condensing units.

80% — 2 — mechanical-type water coolers with two 1-hp. condensing units.

80%—1—ice cream cabinet with one ⅓-hp. condensing unit.

Based on present-day prevailing prices, the average manufacturer's price for such equipment is $142,500 for the total 65 establishments.

The average life of such equipment is estimated at 12½ years and the normal replacement rate at 8% per annum.

(4) UNDER 250 INMATES

Statistics reveal 88 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipment installed in such establishments and the percentage of the total having such refrigeration, in accordance with the following:

80%—1—reach-in refrigerator with one ⅓-hp. condensing unit.

80%—1—walk-in cooler with one 1½-hp. condensing unit.

80%—1—ice cream cabinet with one ⅓-hp. condensing unit.

Based on present-day prevailing prices, the average manufacturer's price for such equipment is $53,200 for the total 88 establishments.

The average life of such equipment is estimated at 12½ years and the normal replacement rate at 8% per annum.

(f) State Prisons and Corrective Institutions

Statistics reveal 1,500 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipment installed in such establishments and the percentage of the total having such refrigeration, in accordance with the following:

80% — 4 — reach-in refrigerators with four ⅓-hp. condensing units.

80%—6—walk-in coolers with three 2-hp. condensing units.

75%—1—ice maker with one 2-hp. condensing unit.

80%—1—ice cream cabinet with one ⅓-hp. condensing unit.

Based on present-day prevailing prices, the average manufacturer's price for such equipment is $3,600,000 for the total 1,500 establishments.

The average life of such equipment is estimated at 12½ years and the normal replacement rate at 8% per annum.

(g) Hospitals

Establishments under this classification were treated under several different subclassifications, as follows:

(1) OVER 300 BEDS

Statistics reveal 323 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipment installed in such establishments and the percentage of the total having such refrigeration, in accordance with the following:

90% — 4 — reach-in refrigerators with four ¼-hp. condensing units.

90% — 4 — reach-in refrigerators with four ⅓-hp. condensing units.

80% — 6 — walk-in coolers with three 2-hp. condensing units.

75% — 3 — mechanical-type water coolers with three 1½-hp. condensing units.

75%—1—ice maker with one 1½-hp. condensing unit.

50% — 1 — blood-bank refrigerator with one ⅓-hp. condensing unit.

80%—1—ice cream cabinet with one ⅓-hp. condensing unit.

Based on present-day prevailing prices, the average manufacturer's price for such equipment is $1,307,800 for the total 323 establishments.

The average life of such equipment is estimated at 12½ years and the normal replacement rate at 8% per annum.

(2) 200 TO 300 BEDS

Statistics reveal 366 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipment installed in such establishments and

(Concluded on Page 24, Column 1)

MANHATTAN
F/HP V-BELTS
MORE POWER
Grips the grooves . . . stops slip—flexible construction for uniform "pull"
LONGER WEAR
Endless cord construction resists internal heat and side wear.
SILENT RUNNING
Smooth running and noiseless on high-speed drives.
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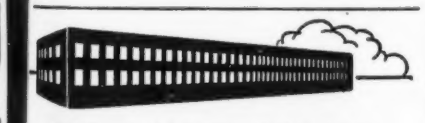


WAR INDUSTRIES NEED REFRIGERATION
The use of refrigeration in industry has been greatly accelerated by the war. In peacetime this expansion may logically be expected to continue. Write for literature.
GENERAL REFRIGERATION DIVISION

Lipman
AUTOMATIC REFRIGERATION

IMPERIAL
Flaring Tools
• built to conserve precious minutes
• designed to do a job that's right the first time

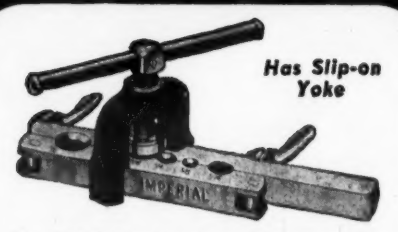
THERE never was a time when good tools were as important as they are today. The good workman does better work and faster work with good tools. And the new man finds it easier to handle his first jobs if he has good tools.

That is why Imperial Flaring Tools are especially valuable under current conditions. The three flaring tools shown at right are typical of the whole line of Imperial tools. They help speed up tubing connection work, and they make joints that are *tight*, and *stay* tight.

These flaring tools, along with Imperial tube cutters, benders, swedging, refacing and other tools, have become the standard of the air conditioning and refrigeration industry.

If your jobber cannot supply you with the Imperial Flaring Tool you need from stock, he can secure it for you in a short time.

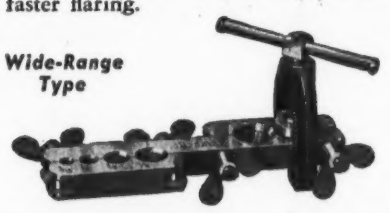
THE IMPERIAL BRASS MFG. CO.
565 S. Racine Avenue, Chicago 7, Illinois



No. 195-F Flaring Tool. Makes correct 45° flares on ¼", 5/16", ⅜", ½" and ⅝" O.D. soft copper, brass or aluminum tubing to make up leakproof SAE flare joints.

The yoke of this tool is made so that it can be slipped over the bar instantly without twisting or turning. Inside edges of yoke are slotted so that once in a position a slight turn holds it in place. This is a big aid to faster flaring.

Wide-Range Type



No. 175-F Flaring Tool. This tool handles a wider range of sizes than the No. 195-F described above. Flares 3/16", ¼", ⅜", ½", ⅝", and ¾" O.D. tubing. Has swivel type cone for easy flaring of large sizes.

Self-Clamping

No. 295-FS Flaring Tool. The newest member of the Imperial Flaring Tool family. Has special self-clamping feature which increases speed and ease of operation. You simply spread the bar, insert tubing, close bar and slide on yoke. Then just make the flare. The bevel yoke automatically causes the bar to clamp the tubing and there are no nuts or other devices to be tightened. Flares ¼", 5/16", ⅜", ½" and ⅝" O.D. tubing.

IMPERIAL Refrigeration and Air Conditioning Products
FITTINGS • VALVES • DEHYDRATORS • FILTERS • FLOATS • CHARGING LINES
TOOLS FOR CUTTING, FLARING, BENDING, COILING, PINCH-OFF AND SWEDGING

POSTWAR PLANNING? ... Why Certainly!
BUT THE RELIABILITY OF THE MOTORS YOU NEED RIGHT NOW FOR WAR PRODUCTION IS IMPORTANT, TOO

Wagner Splash-Proof Motor, 365 frame, two-speed, 1750/1160-rpm.

BUY U.S. WAR BONDS

Sure, we know that postwar planning is necessary. Every manufacturer must stay abreast of the times and be ready to again serve its customers after this war is won—But, Wagner realizes there is a war to win and it is our first job. Wagner is now turning out more motors than ever before—working around the clock to furnish these motors wherever they are needed to help in the war effort. If you need motors now to help speed up the war effort—consult Wagner. • Write for Bulletins MU-183 and MU-182 which describe and illustrate the complete line of Wagner motors. Bulletins MU-7B and MU-30B give complete service instructions.

Wagner Motors for Dependability

Wagner Electric Corporation
ESTABLISHED 1891
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ELECTRICAL AND AUTOMOTIVE PRODUCTS

MOTORS
TRANSFORMERS
UNIT SUBSTATIONS
INDUSTRIAL BRAKES
BRAKE LINING
M44-3C

Hotel Equipment Shown on Basis of Annual Food Sales

(Concluded from Page 23, Column 5)

the percentage of the total having such refrigeration, in accordance with the following:

90% — 6 — reach-in refrigerators with six ⅓-hp. condensing units.

90%—4—walk-in coolers with two 2-hp. condensing units.

80% — 2 — mechanical-type water coolers with two 1-hp. condensing units.

25% — 1 — blood-bank refrigerator with one ⅓-hp. condensing unit.

75%—1—ice cream cabinet with one ⅓-hp. condensing unit.

Based on present-day prevailing prices, the average manufacturer's price for such equipment is $928,100 for the total 366 establishments.

The average life of such equipment is estimated at 12½ years and the normal replacement rate at 8% per annum.

(3) 100 TO 200 BEDS

Statistics reveal 920 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipment installed in such establishments and the percentage of the total having such refrigeration, in accordance with the following:

90% — 4 — reach-in refrigerators with four ⅓-hp. condensing units.

90%—2—walk-in coolers with one 2-hp. condensing unit.

75% — 1 — mechanical-type water cooler with one 1-hp. condensing unit.

80%—1—ice cream cabinet with one ¼-hp. condensing unit.

Based on present-day prevailing prices, the average manufacturer's price for such equipment is $1,309,800 for the total 920 establishments.

The average life of such equipment is estimated at 12½ years and the normal replacement rate at 8% per annum.

(4) UNDER 100 BEDS

Statistics reveal 4,356 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipment installed in such establishments and the percentage of the total having such refrigeration, in accordance with the following:

80% — 2 — reach-in refrigerators with two ⅓-hp. condensing units.

80%—1—walk-in cooler with one 1-hp. condensing unit.

75%—1—ice cream cabinet with one ¼-hp. condensing unit.

Based on present-day prevailing prices, the average manufacturer's price for such equipment is $2,941,000 for the total 4,356 establishments.

The average life of such equipment is estimated at 12½ years and the normal replacement rate at 8% per annum.

(5) VETERANS, OVER 300 BEDS

Statistics reveal 474 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipment installed in such establishments and the percentage of the total having such refrigeration, in accordance with the following:

90% — 4 — reach-in refrigerators with four ¼-hp. condensing units.

90% — 4 — reach-in refrigerators with four ⅓-hp. condensing units.

80%—6—walk-in coolers with three 2-hp. condensing units.

80% — 3 — mechanical-type water coolers with three 1½-hp. condensing units.

75%—1—ice maker with one 2-hp. condensing unit.

50% — 1 — blood-bank refrigerator with one ⅓-hp. condensing unit.

80%—1—ice cream cabinet with one ⅓-hp. condensing unit.

(h) Hotels

Establishments under this classification were treated under several different subclassifications, as follows:

(1) OVER $300,000 ANNUAL FOOD SALES

Statistics reveal 505 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipment installed in such establishments and the percentage of the total having such refrigeration, in accordance with the following:

80% — 8 — reach-in refrigerators with four ½-hp. condensing units.

80%—6—walk-in coolers with three 3-hp. condensing units.

75% — 3 — mechanical-type water coolers with three 1½-hp. condensing units.

60%—2—soda fountains with two 1-hp. condensing units.

75%—3—ice cream cabinets with three ⅓-hp. condensing units.

50%—1—ice maker with one 2-hp. condensing unit.

70%—Salad pans and miscellaneous with one 1-hp. condensing unit.

Based on present-day prevailing prices, the average manufacturer's price for such equipment is $2,398,400 for the total 505 establishments.

The average life of such equipment is estimated at 12½ years and the normal replacement rate at 8% per annum.

(2) $100,000 TO $300,000 ANNUAL FOOD SALES

Statistics reveal 2,258 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipment installed in such establishments and the percentage of the total having such refrigeration, in accordance with the following:

80% — 6 — reach-in refrigerators with three ½-hp. condensing units.

80%—4—walk-in coolers with two 2-hp. condensing units.

75% — 3 — mechanical-type water coolers with three 1-hp. condensing units.

60%—1—soda fountain with one 1-hp. condensing unit.

75%—3—ice cream cabinets with three ⅓-hp. condensing units.

50%—1—ice maker with one 2-hp. condensing unit.

Based on present-day prevailing prices, the average manufacturer's price for such equipment is $6,742,000 for the total 2,258 establishments.

The average life of such equipment is estimated at 12½ years and the normal replacement rate at 8% per annum.

(3)$20,000 TO $100,000 ANNUAL FOOD SALES

Statistics reveal 3,354 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipmnet installed in such establishments and the percentage of the total having such refrigeration, in accordance with the following:

80% — 2 — reach-in refrigerators with two ⅓-hp. condensing units.

80%—2—walk-in coolers with two 1½-hp. condensing units.

80%—1—ice cream cabinet with one ⅓-hp. condensing unit.

80% — 1 — mechanical-type water cooler with one 1-hp. condensing unit.

Based on present-day prevailing prices, the average manufacturer's price for such equipment is $4,547,500 for the total 3,354 establishments.

The average life of such equipment is estimated at 12½ years and the normal replacement rate at 8% per annum.

(4) $10,000 TO $20,000 ANNUAL FOOD SALES

Statistics reveal 4,184 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipment installed in such establishments and the percentage of the total having such refrigeration, in accordance with the following:

80%—1—reach-in refrigerator with one ⅓-hp. condensing unit.

70%—1—walk-in cooler with one ¾-hp. condensing unit.

80%—1—ice cream cabinet with one ¼-hp. condensing unit.

60% — 1 — mechanical-type water cooler with one ½-hp. condensing unit.

Based on present-day prevailing prices, the average manufacturer's price for such equipment is $2,262,250 for the total 4,184 establishments.

The average life of such equipment is estimated at 12½ years and the normal replacement rate at 8% per annum.

(5) UNDER $10,000 ANNUAL FOOD SALES

Statistics reveal 17,686 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipment installed in such establishments and the percentage of the total having such refrigeration, in accordance with the following:

80%—1—reach-in refrigerator with one ⅓-hp. condensing unit.

Based on present-day prevailing prices, the average manufacturer's price for such equipment is $2,170,000 for the 17,686 establishments.

The average life of such equipment is estimated at 12½ years and the normal replacement rate at 8% per annum.

(i) Golf and Country Clubs

Statistics reveal 1,407 establishments under this subclassification. The committee estimated the average size and type of refrigeration equipment installed in such establishments and the percentage of the total having such refrigeration, in accordance with the following:

80%—1—reach-in refrigerator with one ⅓-hp. condensing unit.

70%—1—walk-in cooler with one 1-hp. condensing unit.

70%—1—ice cream cabinet with one ¼-hp. condensing unit.

To Distributors Who Are Interested in a New Post-war Line-up

Juicy steaks, garden-fresh vegetables, fish, fruit and wild game—all of them will be frozen in Sherer Freezers by thousands of Americans on farms, in stores and rural homes the country over —when restrictions are removed.

Freezers, and refrigerator display cases of all kinds will be available when the green light says "go." The famous Sherer Vegetaire, reach-in refrigerators, walk-in cooling rooms, and other commercial refrigeration products, as well as the Sherer Distributor franchise, are available *now!*

Get set for the profitable post-war market in these items by lining up a franchise! Write or wire for details today!

★ ★ ★ ★

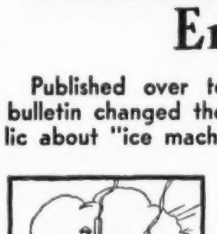
Incidentally, Sherer regularly publishes a Bulletin giving up-to-the-minute interpretations of regulations L-38, P-126 and others affecting the operation of your business. They are written in *your* language (not legal terminology), with actual examples of how these new regulations work out. We will be glad to send you this bulletin service without charge or obligation. Just write us asking that your name be placed on our Special Bulletin mailing list.

Sherer-Gillett Co.

Marshall, Michigan

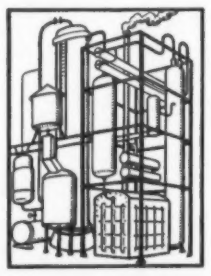
The Folder That Pioneered a New Era

Published over ten years ago, this bulletin changed the mind of the public about "ice machines."



Many plants making explosives use Frick Refrigeration.

Planes, tanks, engines, guns, etc., are accurately built under air conditioning.



Synthetic rubber and other chemical plants require controlled cooling.

Previous to that, people thought of refrigeration as a means of making ice or keeping foods fresh.

Frick Engineers proved that "cold" could be as useful to general industry as to the food industries. They pointed to money-making installations in plants producing rayon, explosives, candy, medicines, dry ice, machinery, printing, etc., etc.

This folder told about that work. It was the first to call Refrigeration the "New Tool of Industry."

Today, hardly an industry can be named but that uses refrigeration in one or more ways, and Frick equipment is playing a vital part in America's War Work.

Our 61 years' experience is available to those having cooling problems to solve.

DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA., U.S.A.

—DEPENDABLE—

TYPES WP AND WL PRESSURE ACTUATED CONDENSING WATER REGULATORS

Individually tested for efficient operation—these valves may be mounted in any position and will give dependable, trouble-free performance. Brass body, two ply power bellows, and corrosion resistant materials for all parts. WL valves are available in ⅜ inch FPT and WP valves in ⅜, ½, and ¾ inch FPT.

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Electrimatic

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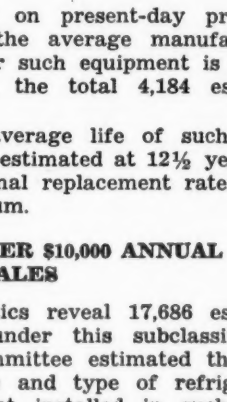
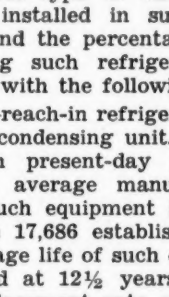


TYPE WP



TYPE WL

Servicing the G-E Refrigerator Line

Unsatisfactory Refrigeration

Machine runs but does not refrigerate properly.

EVAPORATOR FROST	MACHINE RUNNING TIME	OTHER SYMPTOMS	PROBABLE CAUSE	CORRECTION
Normal	Cycles normally	Cabinet too cold	Cold location	Move refrigerator
	Long or continuous	Cabinet too cold	Control set too cold	Reset control warmer
			Bellows clamp loose	Tighten clamp
		Cabinet too warm	Control inoperative	See Note below
			Load excessive	Provide more ventilation
Normal or slight defrosting	Long "Off" periods	Cabinet too warm	Control set too warm	Reset control colder
			Control inoperative	See Note below
Partial or none	Long or continuous	Erratic symptoms	Restriction	Heat evaporator
		Hiss after stopping	Discharge valve or check valve leak	
		Frost valve cooler than condenser	Non-condensable gas (CA and Open-type)	Bleed non-condensable gas
		Compressor noisy	Float valve stuck	Lift or tap float valve
			Refrigerant low	Add refrigerant
		Suction line frosting	Refrigerant overcharge	Purge refrigerant

NOTE: Inoperative controls on DR machines usually can be adjusted or repaired rather than replaced. Inoperative controls on other type machines should be replaced.

Unsatisfactory Refrigeration

The probable cause of an Unsatisfactory Refrigeration complaint usually can be determined by certain conditions or symptoms, most of which are brought out by: (1) Observing evaporator frost (2) Determining machine running time (3) Measuring cabinet and evaporator temperatures. When symptoms differ from those of a machine operating normally, it is usually possible to analyze the probable cause and proceed with the proper correction. It seldom should be necessary to replace the machine.

Cabinet Too Cold

Cause I: Excessively cold location. Cabinet temperature becomes colder as outside temperature goes down.

CORRECTION

1. Move refrigerator to warmer location.
2. Turn control to warmer position. If already at warmest position and refrigerator cannot be moved, reset control warmer.

This may be temporary correction because when outside temperature goes up, cabinet may become too warm. Then control will require resetting to original position.

Cause II: Improper control operation keeps machine running too long and lowers evaporator temperature.

CORRECTION

1. Tighten bellows tube clamp if it is loose.
2. Turn control to warmer position. If already at warmest position, and machine starts and stops regularly, reset control warmer.
3. Replace or repair control if machine runs continuously.
   a. Replace control on all machines except DR Type.
   b. Adjust or repair inoperative controls on DR machines if possible, according to following steps.
   c. Remove control cover and refer to control pictures to identify parts.
   d. Clean main contacts and smooth them with a fine steel file.
   e. Replace bridle spring of upright C, and flat D and E controls, if so weak that it does not snap open main contacts. Replacement steel latch spring must be installed underneath latch of main switch at same time, to properly adjust motor protective device. After these replacements, gap between main contacts should be examined. If not ⅛ inch on C control or 1/16 inch on D and E controls, loosen locknut and turn temperature range adjustment screw.
   f. Straighten inner latch arm or leaf spring attached to main arm of upright A controls to adjust latch snap action.
   g. Tighten nut on temperature range adjustment screw of upright A controls, if necessary, so that temperature range adjustment spring is compressed. Nut should be about ¼ inch from end.

Editor's Note: This is the fifth of a series of articles describing the servicing of General Electric Co.'s refrigerators, which is being published in Air Conditioning & Refrigeration News.

Cabinet Too Warm

Although evaporator frost may appear to be normal, cabinet temperature can be too warm under certain conditions. Causes and correction of such conditions are described below. However, if a cabinet is warm and frost formation is irregular or evaporator does not frost whatsoever, see "Partial or No Refrigeration."

Cause I: Incorrect Usage.

CORRECTION

1. Reduce cabinet load if excessive.
2. Provide maximum air circulation.

Cause II: Improper control operation keeps machine from running long enough to pull down evaporator temperature.

CORRECTION

1. Turn control to colder position. If already at coldest position and machine is "off" for long periods, reset control colder.
2. Replace or repair control if Step 1 is unsuccessful.
   a. Replace control on all machine except DR type.
   b. Adjust or repair inoperative controls on DR machines if possible, according to following steps.
   c. Remove control cover and refer to control pictures to identify parts.
   d. Clean main contacts and smooth them with a fine steel file.
   e. Straighten inner latch arm or leaf spring attached to main arm of upright A controls to adjust latch snap action.
   f. Tighten nut on temperature range adjustment screw of upright A controls, if necessary, so that temperature range adjustment spring is compressed. Nut should be about ¼ inch from end.

Maloney Moves to Acme; Freitas Takes Old Post

JACKSON, Mich.—Joseph T. Maloney, formerly with the Cincinnati office of Fairbanks, Morse & Co., has joined Acme Industries, Inc. here as a sales engineer, and Leo J. Freitas, who spent two years with the War Production Board, has returned to Dallas, Tex. as representative for Acme and Alco Valve, it was announced here.

George Bingham, a former newspaper man, was recently appointed personnel manager for Acme.

Worth Remembering!

¶ No dilution-of-refrigerant worries with Thawzone. Only ⅛ of an ounce required for each pound of refrigerant. Wise refrigeration engineers will remember that fact if some one tries to wean them away from Thawzone.

¶ It costs little to use Thawzone. A 4-oz. bottle is $3 and treats 32 lbs. of refrigerant. That's less than 10¢ for each pound of refrigerant in the system. Compare!

¶ If it had been nothing but an anti-freeze, Thawzone would never have been marketed. It's a dehydrant . . . destroys water chemically. And neutralizes acid too!

"A Little Goes a Long Way"

¶ Time-tested Thawzone is not new. It's used by the Army, the Navy, refrigeration engineers, refrigeration manufacturers, ice cream companies and others. Each year has seen a new sales record.

THAWZONE
Fully Protected by U. S. Patents
The PIONEER FLUID DEHYDRANT

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Die castings, produced by Alcoa, offer a means of utilizing the light weight of aluminum to excellent advantage. Parts have the lightness which permits higher speed operation of equipment, makes handling easier, reduces wear and tear on machines. High quantity and quality production are maintained.

Aluminum die castings have properties suiting them to hard work; high strength, permanence of dimensions and shape, resistance to corrosion, and ability to withstand elevated temperatures. The die-casting process makes possible large quantity production of parts having uniformity and close tolerances, thin sections and smooth surfaces. As a result, Alcoa die-cast products are most economical.

Alcoa's years of experience in this kind of work help you use die castings to best advantage. Assisting in the design of parts to be die cast—building dies for that production—making millions of die castings involving every conceivable problem; this is the experience at your command when you call on Alcoa.

Whether you're producing war materials or planning for peacetimes, we'll gladly help you determine what Alcoa Aluminum die castings will accomplish for you. ALUMINUM COMPANY OF AMERICA, 1975 Gulf Bldg., Pittsburgh, Pa.

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BETTER THAN THE NOSE OF HAL THE HOUND is the LENK HALIDE LEAK DETECTOR

Speedy and positive location of refrigerant leaks is very necessary in wartime.

FOR CONSERVATION OF IRREPLACEABLE SUPPLY... loss of present supply of certain gases spells the end of refrigeration . . . Freon, for example, is restricted to certain government uses and to certain critical operations in industry.

FOR SAFETY . . . toxic gases in some cases replace standard refrigerants . . . guard against toxicants.

FOR GREAT SAVINGS IN TIME AND LABOR . . . there's a shortage of manpower, so use it thriftily. Lenk Detector saves time. Lenk Halide Leak Detector features flame control, shut-off valve, self-cleaning orifice, non-clogging burner.

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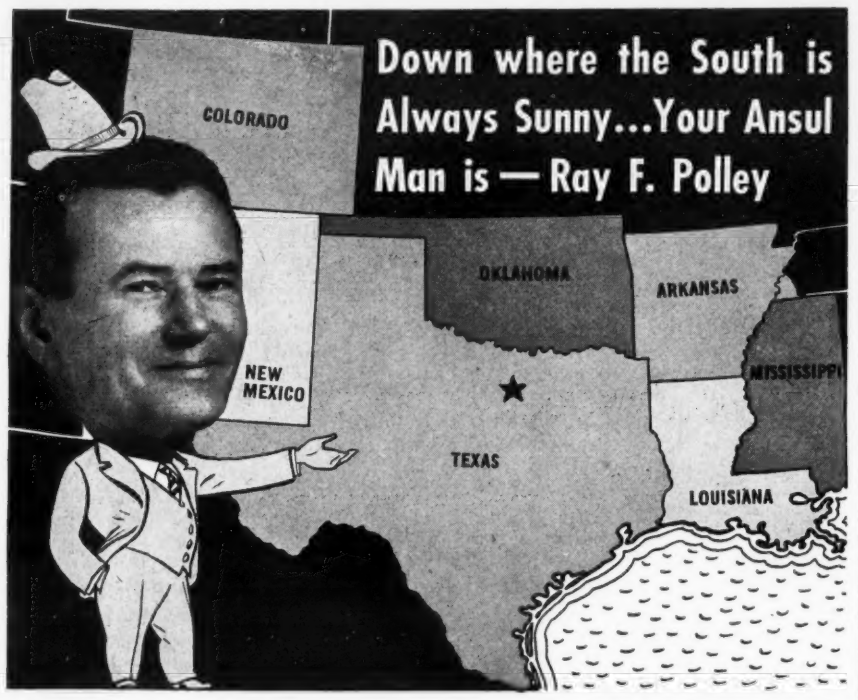

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TWENTY-EIGHT YEARS OF KNOWING HOW

Detroit Service Firms Are Hit Hard By Shortage of Trained Repairmen

Loss of Servicemen In Face of Population Boom Prevents Adequate Repair Work, Survey Proves

The article and the statistics presented below are the result of a survey taken during November and December, 1943, of refrigeration servicing outlets throughout the area of Greater Detroit.

The figures reproduced here, and the points discussed, were gathered first-hand. In only four instances, out of more than 45, did the pressure of outside calls finally make only telephone contact possible. But in every instance, without exception, the figures were submitted in black and white, over the signature of a designated member of the firm.

The questions asked covered the detailed scope of each firm's servicing activity and of the manpower problems being met in the job of maintaining adequate refrigeration for a war-busy city of somewhere in excess of 2,500,000 people.

The firms themselves are not identified. Several expressed that preference when opening their books to us. But they represent all sections of the city, and, as closely as we could plot it, they are a proportional cross section of the entire list of the city's service contractors, large and small.

By **ROSS POTTER**

DETROIT—A citywide, end-of-the-year survey of refrigeration servicing outlets, of their material and manpower facilities and the problem they are up against in 1944, has been completed by the NEWS.

Here are the facts:

1. The city's estimated 225 refrigeration service firms are covering a greater variety of servicing than ever before.

2. With the drafting of refrigeration maintenance personnel, the halted production of new units, and an estimated population increase of 400,000 people in three years, present servicing facilities are far from adequate.

3. Several hundred refrigeration systems in this city alone, in apartment and commercial establishments, are unable to institute repairs necessary to full compliance with safety regulations.

4. The present training of new men, and the deferment of those still on the job, both are measures too little and too late. Half again as many trained men are needed to bring the present manpower level to operating efficiency.

The 45 servicing outlets whose records supplied the statistics for this survey represent 20%, or 1 in 5, of the estimated 225 refrigeration contractors active throughout the city during the closing months of 1943.

The greatest number of service manhours are shown to have been applied to domestic and commercial service and repair. These two fields represented 44.8% and 41.8%, respectively, of the total manhours expended (see Table I).

Yet the trend has not been toward specialization in these two fields alone, nor toward concentration in either one. Notice that of the 45 firms, exactly six handle commercial servic-

(Continued on Page 27, Column 1)

Table 1—Fields of Servicing Activity

Percentages For Each Firm, Sept. 1, 1942-Aug. 31, 1943

	Domestic	Apt.	Com'l	Indus.
	80	10	10	....
	50	26	24	....
	71	7	19	3
	30	....	50	20
5	....	....	50	50
	100	....	....	....
	81	13	6	....
	....	....	50	50
	15	15	55	15
10	5	....	95	....
	55	9	26	10
	30	6	60	4
	80	8	10	2
	40	10	50	....
15	95	2	3	....
	50	....	45	5
	30	....	70	....
	100	....	....	....
	75	15	10	....
20	94	....	6	....
	100	....	....	....
	80	8	12	....
	30	....	10	60
	....	....	100	....
25	34	7	39	20
	100	....	....	....
	41	12	44	3
	30	....	65	5
	60	16	24	....
30	....	....	100	....
	100	....	....	....
	....	....	100	....
	90	....	10	....
	....	....	100	....
35	....	4	90	6
	52	8	28	12
	....	....	60	40
	25	17	45	13
	95	....	5	....
40	25	25	40	10
	15	25	60	....
	57	23	20	....
	....	....	100	....
	....	....	90	10
45	....	....	100	....
Total	**2015**	**266**	**1881**	**338**
Percentage	**44.8**	**5.9**	**41.8**	**7.5**

*Table III—Seasonal Variation in Total Weekly Service Load, by Hours per Week**

	Men	Spring	Summer	Fall	Winter
	1	56	56	56	56
	2	96	144	96	96
	3†	120	156	96	120
	1	45	56	45	34
5	3	216	216	180	144
	1	48	48	48	48
	3	132	180	132	132
	1	44	54	44	44
	3	144	180	144	144
10	1	48	56	44	44
	4	240	240	160	160
	10	640	720	560	480
	2	120	144	96	96
	3	162	216	162	162
15	3	150	195	150	144
	10	600	600	600	600
	1	48	52	40	40
	1	30	30	25	25
	1	84	84	84	84
20	1	24	28	24	24
	2	120	120	....	....‡
	1	72	84	72	60
	1	48	48	6	6§
	1	60	70	48	48
25	26	1,507	1,817	1,247	1,197
	1	44	66	33	6‖
	10	653	846	598	438
	17†	768	768	768	768
	2	48	84	60	60
30	1	48	60	48	40
	3	40	50	30	20¶
	1	72	80	64	60
	11	495	594	198	99§
	2	120	144	120	96
35	4	32	96	....	....‡
	11	495	660	484	440
	4	176	240	176	176
	31	947	1,331	975	699
	1	12	12	12	12
40	5	240	240	220	220
	6£	396	462	396	330
	1	35	40	30	30
	2£	46	77	40	36
	1	58	144/	58	48
45	3	144	144	144	144
Total	**203**	**9,723**	**11,732**	**8,613**	**7,710**
Percentages	....	**25.7**	**31.1**	**22.8**	**20.4**

*Spring: March 1-May 31; summer: June 1-Aug. 31; fall: Sept. 1-Nov. 30; winter: Dec. 1-Feb. 28. †Two are part time men. ‡Firm is less than one year old. §Firm services furnaces during fall and winter. ‖Firm also services washers. ¶Firm services other appliances. £Including one part time man. /Extra man added during summer months.

WHAT do you want in a BREAKER STRIP?

IT must, of course, be a non-metallic material that is a poor conductor of heat to provide a thermal break between the refrigerator wall and the door.

You want a finish that will stand up under hard conditions. If you have Formica you can be sure that it will stand frequent cleaning and scouring, that it will not be injured by "sweating" and the collection of moisture on the surface.

You also require a material that is stable in dimensions under changes in temperature and humidity. Formica has a very low moisture absorption and a very low coefficient of thermal expansion. Consequently it resists buckling and warping, and maintains a permanent flatness that assures even wear and good contact between the door and tank wall.

These are the good reasons why high grade refrigerators should have Formica breaker strips, as well as door backs, and molding between the refrigerator and deep-freeze compartments.

THE FORMICA INSULATION COMPANY

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Table II—Breakdown of Commercial Servicing Activity
Percentages: Sept. 1, 1942—Aug. 31, 1943

	Bars	Dairies	Florists	Food Markets	General Stores	Hospitals	Hotels	Military Camps	Motor Trucks	Packing Houses	Restaurants	Schools	Ships	Theaters	Others	Total Commercial
	....	....	....	4	....	....	....	....	....	....	2	....	....	....	4	10
	8	....	....	8	....	....	....	....	....	....	8	....	....	....	....	24
	....	....	....	19	....	....	....	....	....	....	....	....	....	....	....	19
	....	....	....	....	15	30	....	....	....	....	5	....	....	....	....	50
5	....	....	....	....	....	....	25	....	....	....	....	....	....	25	....	50
	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	....	2	....	2	....	....	....	....	....	....	2	....	....	....	....	6
	....	10	....	15	....	10	....	....	....	15	....	....	....	....	....	50
	5	4	....	28	....	3	....	....	....	6	9	....	....	....	....	55
10	....	....	....	50	....	5	....	5	....	....	35	....	....	....	....	95
	....	....	....	23	....	....	....	1	....	....	1	1	....	....	....	26
	6	24	....	15	....	2	1	....	....	....	9	2	1	....	....	60
	....	....	....	7	....	....	....	....	....	....	3	....	....	....	....	10
	5	3	2	25	....	....	....	....	....	....	15	....	....	....	....	50
15	....	....	....	2	....	....	....	....	....	....	1	....	....	....	....	3
	2	....	....	15	....	5	....	....	....	....	15	3	5	....	....	45
	....	35	....	35	....	....	....	....	....	....	....	....	....	....	....	70
	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	....	....	....	5	....	....	....	....	....	....	5	....	....	....	....	10
20	....	....	....	....	....	3	....	....	....	....	....	3	....	....	....	6
	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	....	....	....	4	....	4	....	....	....	....	4	....	....	....	....	12
	3	....	....	....	....	3	4	....	....	....	....	....	....	....	....	10
	....	....	....	50	....	....	....	....	....	....	50	....	....	....	....	100
25	7	....	....	14	....	....	18	....	....	....	....	....	....	....	....	39
	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	2	3	....	35	....	....	....	1	....	2	1	....	....	....	....	44
	5	5	....	15	....	....	....	....	....	....	40	....	....	....	....	65
	2	2	....	16	....	....	....	....	....	....	4	....	....	....	....	24
30	....	....	....	....	....	....	....	....	100	....	....	....	....	....	....	100
	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	....	....	....	86	....	....	....	....	....	....	14	....	....	....	....	100
	....	....	....	....	....	....	....	....	....	....	5	5	....	....	....	10
	5	....	....	20	....	....	....	....	....	....	75	....	....	....	....	100
35	1	....	....	38	....	....	3	....	....	....	48	....	....	....	....	90
	2	4	1	11	....	....	1	....	....	....	7	2	....	....	....	28
	....	....	....	15	....	15	6	....	....	....	15	9	....	....	....	60
	2	6	....	9	....	7	4	2	....	5	5	2	1	....	2	45
	3	....	....	....	....	....	....	....	....	....	2	....	....	....	....	5
40	5	5	....	20	....	....	....	....	....	....	10	....	....	....	....	40
	3	3	....	24	....	3	3	....	....	....	24	....	....	....	....	60
	....	....	....	2	....	....	....	....	....	....	11	....	....	....	7	20
	10	5	3	30	....	....	....	....	....	18	30	....	....	....	4	100
	35	....	....	....	....	....	5	....	....	....	50	....	....	....	....	90
45	....	15	....	30	....	5	5	....	....	10	35	....	....	....	....	100
Total	111	126	6	672	15	95	75	9	100	56	540	27	7	25	17	1,881
Percentages	5.8	6.7	*	35.7	*	5.1	4.0	*	5.3	3.0	28.7	1.4	*	1.3	*	

* = less than 1%.

Detroit's Plight

(Continued from Page 26, Column 5)

ing alone, five handle domestic alone, and only four handle these two and no more.

Notice on the other hand that 40 *firms* **include** commercial servicing in their activity, and that 34 include domestic repair. The trend since the beginning of the war thus has been toward a wider variety of servicing activity. Factors of transportation difficulties—the shortages of gas and tires and extra men—have contributed heavily here.

Meanwhile, refrigeration servicing needs have steadily grown. Increases estimated by the U. S. Bureau of the Census reveal a constant rise in the city's population level since 1940, the year of the last official count. The estimated figures read as follows:

Year	Detroit Proper	Greater Detroit
1940	1,623,452	2,545,832
1941	1,775,000	2,610,000
1942	1,875,000	2,775,000
1943	1,915,000	.....

No estimated figure for the metropolis as a whole had been published by March 1, but if the increase in the metropolitan area continued to parallel that within the city limits, the figure would approach 3 million. In the face of this, the service problem had become serious.

The light participation of apartment and industrial servicing figures is no indication that these are suffering actual neglect. Apartment house multiple systems properly are commercial installations, and technically belong within commercial classification. They were considered separately for survey purposes, but the tabulated figures point out the fiction of that assumption.

Industrial servicing, on the other hand, represented few manhours because such installations usually are of such size that the companies using them have their own engineers to take care of them. The outside servicing firm comes in to install the system and to set it in motion. After that, it is needed as a rule only under emergency conditions.

As to geographic location, those firms specializing in commercial and industrial maintenance were found usually near the city's business center, or in the heart of the smaller business communities within the sphere of the greater metropolis.

The service outlets doing the major part of their work in domestic unit repair were found most often in the shopping centers of the city's residential areas.

Most important in the relationship between these two phases of servicing activity, servicemen revealed, is the relative decline of the actual time now expended in domestic repair. In former years domestic servicing as a whole dominated the field.

The results of this marked slackening in home refrigeration maintenance appeared from time to time last summer on the front pages of newspapers here and there all over the country—in stories of sickness and death that came from improperly refrigerated foods.

The direction that the increased emphasis on commercial servicing has taken is indicated in Table II, which

(Concluded on Page 28, Column 1)

"FOUNTAINS of MORALE"

OASIS Electric Water Coolers

There's nothing better, more healthful, more sensible than cool, fresh water for getting rid of "thirst-fatigue." This recognized fact creates active business for you now—supplying Ebco's popular OASIS ELECTRIC WATER COOLERS to vital war plants. OASIS coolers assure the most enjoyable, invigorating, drinkably-controlled flow of water ever developed — they're "fountains of morale." That's because they're made in one of the most advanced production-line plants of its kind—by people who pioneered in the electric water cooler field. Write for information today!

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● The efficient operation of Acme shell and tube condensers for Freon and methyl chloride has long been recognized throughout the industry. Shells of seamless steel tubing eliminate possibility of leaks that could occur in welded shells. "All-in-one" finned tubing, one piece of metal, assures maximum heat transfer efficiency. Removable heads make them cleanable. Tubes are replaceable. STANDARD model capacities up to 120 tons—SENIOR models up to 460 tons.

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For the same reason they put erasers on pencils—

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MISTAKES will happen. Even a Marsh Gauge or Dial Thermometer can be knocked out of adjustment. But with the "Recalibrator" you have a simple, completely satisfactory way to erase the error.

Don't confuse the "Recalibrator" with ordinary "adjustments". It does exactly what the name implies—recalibrates the instrument throughout its entire range, by re-establishing the proper relation between the bourdon tube and the movement.

Available in all Marsh Gauges, standard in all Marsh Dial Thermometers, the "Recalibrator" is typical of the advanced design and construction Marsh has developed through 75 years of gauge making. With gauges today facing harder and longer service, more and more refrigeration men make it a point to look for the "Recalibrator."

JAS. P. MARSH CORP.
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MARSH
Refrigeration Instruments

One-Third More Men Needed by Detroit Firms, Survey Shows

(Concluded from Page 27, Column 3)

breaks down the column in Table I into specific figures as to the number of manhours spent in servicing various kinds of commercial installations.

Food markets and restaurants are given by far the most attention. Between them they represent two thirds of the total. Increased business in the form of fugitives from home rationing of course has added to the restaurants' burden, but restaurants too are rationed.

The greater part of increased restaurant business has come from the influx of war workers unable to find adequate home facilities. They have added, too, to the overloaded refrigeration problems of the food market proprietor.

Hospitals, hotels, and theaters have registered increased use of their facilities during the past two years, but this fact has been reflected only slightly in added service demands, according to refrigeration companies listing these in their records.

Bars and dairy bars, however, have shown preceptible increases in their service demands, they reported. So have shipping companies both overland and maritime.

The increased load upon the service contractors themselves is revealed even more sharply in the manpower figures in their records. For most of them, their service staffs are handling loads beyond their physical capacities.

Only a few could report little change, and almost all of these had not radically changed their schedules only because it was obsolutely impossible to do so.

Some dropped out of business entirely. Of the total 235 refrigeration contractors registered and licensed by the city by March 1, 1943 (the final deadline), an estimated 10 had folded before November.

This estimate was confirmed last week in the last-minute rush of registrations for the current year. Of 63 firms that had not renewed their licenses in January, between 40 and 50 applications had come in during the last week. Final fatality count: 10-20.

This figure is a marked improvement, however, over previous losses. In 1941, 299 refrigeration contractors took out licenses. In 1942, only 270. In 1943, 235.

An actual count of the manpower picture at the peak season of each year is indicated for the years 1940-1943 in Table IV. The variation in service demands within any given year is indicated in Table III. The figures given represent the actual records from Sept. 1, 1942, beginning the fall season, to Aug. 31, 1943, ending the summer of the year following.

The ages of the firms represented, shown merely for background value, reveal one interesting point: The most important year for the founding of refrigeration service businesses, or for the inclusion of that activity by firms already established, was 1935.

Of the total, 19 firms are less than five years old, and another 19 are less than 10. This yeaves only seven that are more than 10 years old. The average by coincidence is seven and a half years, which goes back to the peak season of the peak year, 1935.

The high mortality among refrigeration service men is indicated in Table IV. The highest personnel level was 222, reached in 1942. Fifty of these were gone a year later—25 lost outright, 25 replaced. And of the remainder, another 109 were vulnerable to the draft at the end of 1943.

A tremendously significant fact is the preservation of the personnel figure from July to November in 1943. Actually, some refrigeration service men must have been lost to the draft during that period, but in terms of the whole it must have been very few.

Credit for this goes to the efforts of the industry as a whole to reach occupational deferments for its service men. The July and November figures in Table IV are a tribute to the success of the campaign.

In spite of this encouraging note, two indisputable facts stand out to emphasize the seriousness of present refrigeration servicing conditions. Notice the final column in Table IV: Additional men needed in these firms—91.

That figure represents almost a third of the total manpower now in the field. If this figure is representative at all, then the refrigeration service front, in spite of working to the utmost of its ability, is still falling far short of a very vital objective.

Added to this statistical point is another fact, found in the files of the city's Department of Building and Safety Engineering. There, in the file listing the names of firms, apartment houses, and industrial establishments whose refrigeration systems are not up to standard, are hundreds of entries.

Each of these has been notified of the inadequacy of their system's operation, that safety maintenance will not permit continuation. Each of them has tried, and produced evidence that they have tried, to get the system repaired. They have been unable to.

Materials are hard to get. Experienced men are harder to get. And to get any one of the already overworked servicing companies to add another name to its list is not merely hard; it is impossible.

Table IV—Present Service Manpower Picture

	Age of Firm In Years	Service Staff, July 1, 1940	Service Staff July 1, 1941	Service Staff July 1, 1942	Service Staff, July 1, 1943	Service Staff, Nov.-Dec., 1943	No. of These Liable to Draft*, Dec., 1943	No. Already Replaced Since July 1, 1942	Additional Men Needed in These Firms
	3	3	3	2	1	1	....	....	1
	15	9	9	4	2	2	1	....	5
	7	2	2	4	3/	4‖	2	2	2
	10	4	3	2	1	1	....	....	2
5	9	3	3	3	3	3	1	....	....
	7	2	2	2	2	1	2	....	....
	2	....	6	6	4	3	2	....	6
	13	10	8	3	1	1	....	....	....
	7	7	5	5	5	3	3	3	3
10	7	1	1	1	1	1	1	....	....
	4	6	4	4	4	4	1	....	2
	1	....	....	4	10	10	7	1	2
	6†	2	2	2	2	2	2	....	1
	7	5	5	4	3	3	....	....	3¶
15	12	2	3	5	3	3	2	1	1
	4	9	10	11	11	10	6	1	1
	8	7	7	6	1	1	....	....	5
	4	1	1	1	1	1	....	....	....
	22	1	1	1	1	1	....	....	....
20	2	1	1	1	1	1	....	....	....
	....‡	....	....	....	2	2	....	....	1
	7	1	1	1	1	1	....	....	1
	10	2	2	1	1	1	1	....	....
	4	1	1	1	1	1	....	....	....
25	5	8	12	22	26	26	16	3	5
	11	3	3	3	1	....§	....	....	10
	7	12	15	11	10	10	5	....	5
	12	15	18	20	17/	15	12	2	8
	2	....	....	4	2	2	2	....	3
30	4	3	3	2	1	1	1	....	1
	7	2	2	2	3	3	2	1	1
	4	3	3	3	1	1	....	....	3
	10†	14	14	14	11	11	3	....	....
	5	2	2	2	....§	....§	....	....	2
35	....‡	....	....	....	3	4	3	2	2
	3	13	11	8	10	11	4	2	17
	8	14	12	5	4	4	....	....	8
	1	....	....	27	25	31	24	5	5
	1	....	....	....	1	1	1	....	....
40	9	2	4	8	5	5	1	....	3
	10	5	5	5	5	6£	2	1	2
	3	....	1	1	1	1	....	....	....
	8	1	1	1	1	2£	....	1	....
	8	5	4	2	2	1	....	....	4
45	67	3	3	3	3	3	2	....	1
	356	184	193	222	197	197	109	25	91

*Not 4F nor over 38. †Took on refrigeration servicing then. ‡Less than one year old. §Repairs now farmed out. ‖Includes three part time shop men. ¶Needed for peak season; only two during slack season. £Includes one part time man. /Includes two part time men.

Illustration is from an Inland Poster showing Inland-made Tank Shoes being assembled into complete Tank Tracks

Ever mindful of the fact that the Victory, for which Americans and their Allies are fighting, is far from won, Inland workers and management are devoting the full measure of their energy and ability, each day, to production which will help shorten the war.

INLAND MANUFACTURING DIVISION
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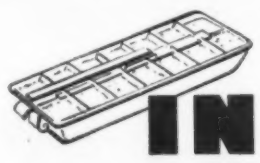
Inland Products for Victory include Carbines, Tank Tracks, Gun Sights, Helmet Liners, Extinguisher Horns, and Rubber and Metal Parts for Tanks, Aircraft, Submarine Chasers, Torpedo Boats, Artillery Lighters and Landing Craft.



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Army Refrigeration Problems

By P. B. Reed

Manager, Refrigeration and Air Conditioning Division, Perfex Corp.

The Simple, Obvious Causes of Troubles

The simplest and most obvious causes of trouble are frequently the most difficult to trace to their source; perhaps because the answer is so simple that no one happens to think of the possibility of anything so obvious being responsible. Things that are taken for granted are easily overlooked. The following are examples of how such things can cause trouble that is difficult to trace, just because of its simplicity.

A NOISY COMPRESSOR

An air-conditioning compressor was quite noisy on the pump-down. The suction pressure was averaging 38 p.s.i. (Freon-12) and at that suction pressure the installation was operating quietly, but when the room thermostat was satisfied and closed the liquid line solenoid valve and the compressor pumped the low-side down, the compressor became noisy when the suction pressure was reduced to about 25 p.s.i. and the compressor was pounding heavily by the time the pressure control cut the compressor off at 12 p.s.i. It was pointed out that there was no need to pump the compressor down to 12 p.s.i. so the cut-off pressure of the pressure control was raised to 18 p.s.i.

It was first suspected that liquid Freon-12 was being returned to the compressure, but a thermometer was attached to the suction line at the compressor and this thermometer read 67° F. indicating about 25° of superheat which eliminated any possibility of liquid pumping. The compressor was disassembled and examined. The bearings were all tight, piston head clearances OK and apparently nothing wrong mechanically.

Finally, the serviceman called the factory and a man was sent out. He found the oil level too high and took three quarts of oil out of the compressor, after which the compressor operated quietly both during a normal run and during the pump-down. The rods were churning the oil and during the pump-down, just enough refrigerant was being boiled out of the oil to cause enough turbulence to pump excessive amounts of oil past the pistons which of course caused the heavy pounding noise.

THREE PHASE MOTOR TROUBLE

In another case motor trouble was being experienced with a 7½ horsepower three phase motor on a condensing unit in an air base. One motor had been burned out on the unit and the second was having trouble picking up the load. The compressor was pronounced OK; belts were not too tight; everything seemed quite satisfactory mechanically.

Local and air base electricians had checked voltage and, although it was not quite 220 volts, showed 216 and never lower than 208 even when the motor was coming up to speed. Finally the second motor was changed and a new one of another make was put on. This motor was perhaps very slightly better than the other two and yet it would stall about one time out of five starts.

UNBALANCED PHASES

Finally someone in testing for voltage, noticed that while the two outside poles of the switch showed 218 volts on that phase, one of the other phases showed 198 volts and the third 179 volts. It was found that this condition existed at the building entrance switch and it was ultimately traced to a bad out-of-balance condition in the primary system itself, due chiefly to a lot of electric ranges being connected to two of the phases although for some obscure reason very few had been connected to the third phase which happened to be the one between the two outer blades of the switch and these were the ones to which the voltmeter had been connected on most of the tests.

A redistribution of the single phase loads and an increase in the primary capacities cured the job and no trouble was experienced after all three phases were given their full 220 volts.

UNIT RUNS CONTINUOUSLY, EVAPORATOR ONLY SWEATS

A ½-hp. unit was installed on a 5 x 7 foot walkin cooler in a northern city. The evaporator was a flash coil of generous size for that size cooler. The installation was completed about 4 p.m. one July day and the unit put into operation. Even though the cooler was empty and the only load was heat leakage the evaporator only sweated and by 8 o'clock no frost had appeared on the flash coil with the condensing unit running continuously and the cooler temperature 67°.

The installation men started tracing. They checked the expansion valve; they adjusted it up and down. They checked the compressor; the discharge and suction valves. They checked the amount of charge in the system. They checked discharge and suction pressure. Both were abnormally high.

At midnight they called the supervisor and he came down and repeated all the checks the installation men had made, until finally about 4 a.m. he realized what was the matter. The cooler was old and not only were there large cracks between the sections but the insulation (not cork) had become wet and for all practical purposes, worthless.

The cooler should never have had electric refrigeration applied to it, nor in fact should it have been used with ice. It was too wasteful for any type of refrigeration. The cost of reinsulating it was prohibitive and the most practical thing to do with it was simply to junk it and replace it with a new cooler. This was done and the refrigeration equipment functioned quite satisfactorily.

OVERLOOKING THE OBVIOUS CONDITIONS

If we are not careful we are apt to overlook the simple obvious conditions. We are worried and anxious and likely to grope for some mysterious course of trouble when in fact the cause it right under our noses just begging to be seen and recognized.

Anchor Firm in Buffalo To Enlarge Building

BUFFALO — The Anchor Refrigeration Service, 1024 Genesee St., has secured a building permit to enlarge its premises.

Grunow Service Co. Has 28-Page Booklet on Servicing Operations

CHICAGO — A new, condensed service manual has just been published by Grunow Authorized Service Co. The 28 page book illustrates and describes every type of service operation in Grunow refrigeration systems.

The new book presents a short but informative introduction on the theory of refrigeration; a description of the attributes of Carrene No. 1; and then a detailed description with illustrations of the principle of operation of the Grunow refrigerator.

The principal parts taken up are: dehydrator, check valve, float valve, carrene meter-receiver, radiator-condenser, evaporator, compressor assembly, motor and electrical unit. Also included are complete wiring diagrams of all models and all electrical units of each model.

Detailed descriptions for procedure on all important service operations are also given. These include: testing for leaks, using the leak detector, purging the system, checking the Carrene charge, thermostat adjustments, testing the relay, testing capacitor, testing transformer, removal, reinstallation and replacement of component parts, removal of unit, removal of compressor unit assembly, removal of condenser-radiator, removal of Carrene meter or float, removal of fan, removal of evaporator, and disassembly and reassembly.

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The makers of the Amcoil Food Conditioner are pleased to announce that this new, portable unit is now ready for distribution. Compact, completely automatic, controlling moisture as well as temperatures, the latest Amcoil to be placed in production offers users of walk-in and reach-in boxes a positive, practical answer to problems of food storage.

This Amcoil-engineered development is in reality a "packaged refrigeration system." To its war-time usefulness will be added a wide range of future industrial applications. It is available today on rated orders:—AA5 or better under L-38.

A specification sheet gives dimensions and details on the Amcoil Food Conditioner. It will be sent you along with any information you may request on distribution plans. Bulletins are also available on new companion items to this unit. These include All Service Cooling Units, Condensing Unit Housing and Comfortaire Conditioners.

AMCOIL
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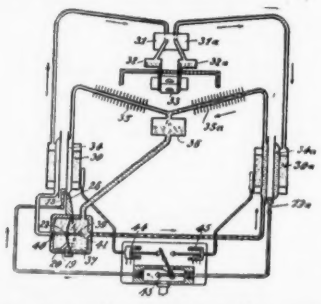
• 8260

PATENTS

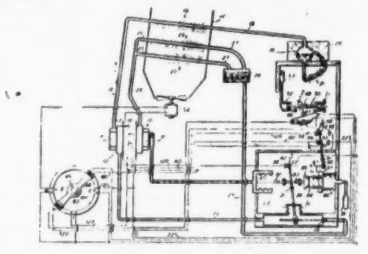
Weeks of Feb. 8 & 15

2,340,886. THERMOSTAT VALVE OPERATING MECHANISM FOR ABSORPTION REFRIGERATING APPARATUS. Nils Erland af Kleen, Stockholm, Sweden, assignor to Kleen Refrigerator, Inc., Hoboken, N. J., a corporation of Delaware. Application June 13, 1940, Serial No. 340,291. 6 Claims. (Cl. 62—5).



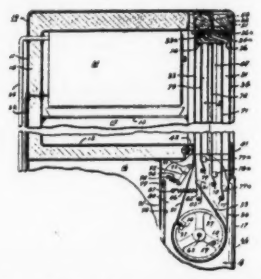
1. In absorption refrigerating apparatus of the intermittent type including a plurality of units operating in alternate phase relation to one another, each unit having a boiler absorber adapted to be intermittently heated and alternately cooled during the corresponding generating and absorbing periods thereof; the combination with means for intermittently heating each of said boiler absorbers in alternate phase relation to one another, and fluid cooling means for cooling said boiler absorbers; of valve means for controlling the flow of cooling fluid to each of said boiler absorbers, and a bi-metallic thermostat member in thermal transfer relation to the heat supplied by said heating means to only one of said boiler absorbers and operatively connected to said valve means to control the cooling of each of said boiler absorbers intermittently and in phase relation to the heating thereof.

2,340,887. CONTROL MECHANISM FOR ABSORPTION REFRIGERATING APPARATUS. Nils Erland af Kleen, Stockholm, Sweden, assignor to Kleen Refrigerator, Inc., Hoboken, N. J., a corporation of Delaware. Application December 12, 1940, Serial No. 369,780. 22 Claims. (Cl. 62—5).



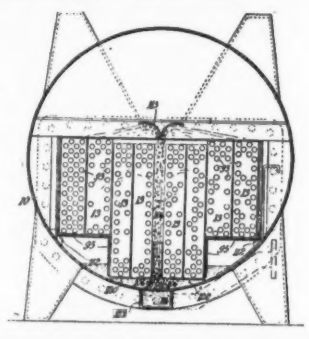
6. In refrigerating apparatus of the intermittent absorption type operating to cool an enclosed space and including combined generating and asborbing means, the combination with heating means and cooling means for said combined generating and absorbing means, and thermostat mechanism responsive to the temperature in said combined generating and absorbing means for selectively controlling the heating and cooling of the latter; of adjustable means for controlling the rate of heating and the corresponding rate of cooling of said heating means and cooling means, respectively, said adjustable means including thermostat means responsive to the temperature in said space being cooled for regulating the rate of heating of said heating means between a predetermined minimum and a predetermined maximum.

2,341,123. REFRIGERATING APPARATUS. Edmund F. Schweller, Dayton, Ohio, assignor to General Motors Corp., Dayton, Ohio, a corporation of Delaware. Application Oct. 21, 1942, Serial No. 462,792. 10 Claims. (Cl. 160—120).



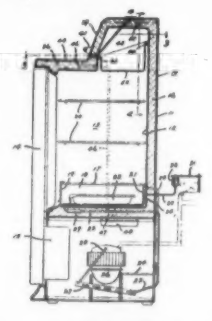
1. In a refrigerator, a cabinet structure including a food storage chamber having an access opening in a wall thereof, a plurality of flexible sheet members connected to one another and extending continuously in spaced apart relation along said chamber access opening to form a door normally closing same, roller means within said cabinet adjacent said chamber access opening for flexing and winding said members thereupon to cause sliding movement of said door, and said roller means being operable to cause the door to open said chamber access opening.

2,341,132. MECHANICAL REFRIGERATING SYSTEM. Robert W. Waterfill, Montclair, N. J., assignor to Buensod-Stacey, Inc., a corporation of Delaware. Application Aug. 3, 1940, Serial No. 350,785. 13 Claims. (Cl. 62—126).



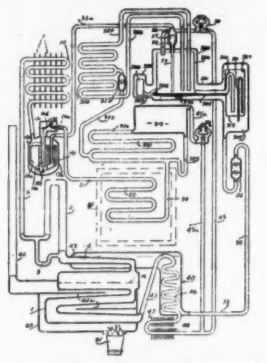
1. A shell-and-tube refrigerant evaporator of the type wherein the tube bank is not submerged in liquid refrigerant, such evaporator comprising a shell adapted to serve as a part of a closed path for a refrigerating fluid, a bank of tubes adapted to serve as a path for a fluid to be cooled, some of said tubes being spaced apart to leave a substantially clear passageway extending vertically and longitudinally through the bank, and means for introducing liquid refrigerant into the base of said shell, said means being adapted to distribute the introduced refrigerant lengthwise of said bank and to direct liquid refrigerant and flash gas upwardly into the passageway of the bank, said passageway being of such proportions as to confine the flash gas laterally whereby to cause it to lift liquid refrigerant through said passageway and to distribute it over said tubes.

2,341,183. REFRIGERATING APPARATUS. Raymond Loewy, New York, N. Y., assignor to General Motors Corp., Dayton, Ohio, a corporation of Delaware. Application July 17, 1941, Serial No. 402,814. 10 Claims. (Cl. 62—89).



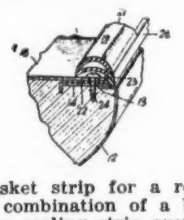
1. A refrigerating apparatus comprising in combination a household refrigerator cabinet having a plurality of insulated walls forming a main food storage chamber therein, an access opening for said chamber provided in the front wall of said cabinet, a door normally closing said chamber access opening, an evaporator of a closed refrigerating system within said chamber for cooling the interior thereof and for freezing the contents of trays adapted to be thermally associated therewith, the back portion of the cabinet top wall being disposed at a greater elevation than the front portion thereof to provide a food storage space upwardly of and along the back of said main food storage chamber, a receptacle disposed between the back edge of said front portion of said cabinet top wall and the cabinet back wall for supporting articles within said upper food storage space, a door or doors intermediate said portions of said cabinet top wall providing access to the articles supported by said receptacle in the upper food storage space from the front of said cabinet, and said front portion of said cabinet top wall being of a height corresponding to the height of a work table top and serving as a work ledge.

2,341,188. ABSORPTION REFRIGERATION APPARATUS. Wilbur G. Midnight, Shaker Heights, Ohio, assignor to Perfection Stove Co., Cleveland, Ohio, a corporation of Ohio. Application Nov. 7, 1941, Serial No. 418,217. 18 Claims. (Cl. 62—5).



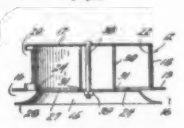
1. In an absorption refrigeration apparatus characterized by a high pressure section and a low pressure section and including a generator in the high pressure section and an evaporator in the low pressure section, absorber means having a liquor compartment the bottom of which is at an elevation above the maximum liquid level in the generator, conduit means conducting weak liquor from the generator to the liquor compartment of the absorber means, conduit means conducting refrigerant gas from the evaporator to the absorber means, drain connections between the absorber means and the generator including a self acting non-return flow device, communicative connections between the high pressure section and the absorber means, a valve in said connections, and floatless mechanism set in action by the weight of an accumulation of liquor to a given volume within the liquor compartment of the absorber means that acts solely on said value and independently of said non-return flow device to open said valve and maintain the same open until practically all liquor ha spassed from the liquor compartment of the absorber means to the aforesaid drain connections.

2,341,200. REFRIGERATOR CABINET CONSTRUCTION. Orland H. Yoxsimer, Mansfield, Ohio, assignor to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., a corporation of Pennsylvania. Application Dec. 12, 1941, Serial No. 422,619. 2 Claims. (Cl. 20—69).



1. In a gasket strip for a refrigerator cabinet, the combination of a broad, flat flange strip, a sealing strip overlying and spaced from said flange strip, a connecting strip joined at one of its side edges to a side edge of said sealing strip and at the other of its side edges to a side edge of said flange strip to form a gasket strip of approximately U-shaped section, said flange and sealing strips consisting of soft rubber and said connecting strip consisting at least in part of relatively harder rubber, said gasket strip being elastic to afford endwise stretching to such an extent that, when so stretched, it lies smoothly and unwrinkled when fitted around a corner of sheet material, said corner being rounded to a radius of three times the breadth of said flange strip and said gasket strip straddling the edge of said sheet material.

2,341,296. VENTILATING MEANS. Franklin L. Slade, Washington, D. C. Application March 23, 1942, Serial No. 435,898. 13 Claims. (Cl. 98—40).



1. In a ventilating system or the like, a diffuser unit for introducing air into a room or other enclosure, said unit comprising, in combination, a hollow cylindrical member having a closed end and an open end, and an inlet opening in its side wall, means for directing flow of air into said opening and a centrally disposed baffle element within said member and directly behind said opening, said element providing a generally spiral interior wall surface perpendicular to said closed end and forming with the closed end and side wall of the cylindrical member a substantially annular channel which gradually diminishes in cross-sectional area from a maximum at the inlet opening of the cylindrical member, around the member, to a minimum at a point adjacent said opening, whereby the air will be discharged over the rim of the open end of the cylindrical member substantially equally at all points around said rim.

2,341,429. METHOD OF RECONDITIONING REFRIGERATING APPARATUS AND RECLAIMING REFRIGERANT.

(Concluded on Page 31, Column 2)

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SALES ENGINEER: Experienced application-sales, installation of air conditioning, refrigeration and heating equipment. Is desirous of obtaining representation of factory lines for present and postwar. Familiar with and now handling priority business New York, New Jersey. Correspondence invited. Box 1524, Air Conditioning & Refrigeration News.

SELLING OUT service business, nine years present location servicing and installing commercial refrigeration and air conditioning, all makes. 39 years of age. 3A(H) classification with over 15 years' refrigeration service. References. Will begin work May 1-15. State salary and working conditions. Loyd Adcock, Box 795, Corpus Christi, Texas.

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AIR CONDITIONING and industrial refrigeration engineer with proven sales and supervision record. Immediate opportunity to affiliate with prominent Southern California distributor and contractor. Excellent postwar outlook. Give complete history and details in first letter. Reply Box 1521 Air Conditioning & Refrigeration News.

WONDERFUL OPPORTUNITY with large well-established midwest concern for estimating engineer approximately one year; then sales engineer covering air conditioning and industrial refrigeration equipment all sizes. No household units. State qualifications, draft status, and experience. Engineering education essential. Excellent chance for man with refrigeration experience to locate for postwar. Box 1526, Air Conditioning & Refrigeration News.

EXCELLENT OPPORTUNITY in charge of sales department of well established and recognized wholesale parts and accessories refrigeration wholesaler. A large volume business already established covering four Eastern States. Must be thoroughly familiar with refrigeration business. State qualifications in full. Box 1531, Air Conditioning & Refrigeration News.

REFRIGERATION ENGINEER: Substantial midwestern manufacturing firm planning entry into refrigeration field has attractive opening for young graduate engineer in equipment development department. Considerable laboratory work now and excellent post-war opportunities to grow with the refrigeration department. Limited practical experience helpful. Box 1528, Air Conditioning & Refrigeration News.

A WELL KNOWN MANUFACTURER of an important refrigeration component is in need of several experienced salesmen for several territories. This represents a good opportunity during the war and a much better one during post-war. Box. 1530, Air Conditioning & Refrigeration News.

MECHANICAL ENGINEER experienced in the design of refrigerating compressors and auxiliary equipment by a large Mid-West manufacturer. Reply confidential. Position permanent. Box 1529, Air Conditioning & Refrigeration News.

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NOTICE—SERVICE MAN: If you are interested in going with a distributor of several lines of nationally known products, consisting of refrigerators, ranges, washing machines, etc. in the capacity of a service man, and eventually service manager, we would like to get in touch with you. If you are not capable of doing the physical service work yourself and do not feel you will be able to manage and direct men in the future please do not reply. Location is in the South. Box 1525, Air Conditioning & Refrigeration News.

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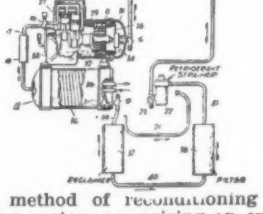
Patents (Cont.)

(Concluded from Page 30, Column 4)

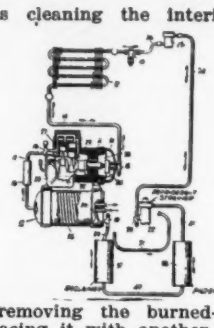
Howard M. Elsey, Oakmont, Pa., assignor to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., a corporation of Pennsylvania. Application July 19, 1940, Serial No. 346,278. 3 Claims. (Cl. 62—170).



1. The method of reconditioning a refrigerating system comprising an enclosed motor-compressor unit having a crankcase, the stator of which has burned out in the presence of a hydrocarbon lubricant and a refrigerant containing fluorine and chlorine, which method comprises cleaning the crankcase mechanically and by washing, removing the burned-out stator and replacing it with another stator, and then operating the compressor to circulate refrigerant through the refrigerating system and in such circulation conveying the refrigerant in contact with an absorbent material adapted to remove deleterious carbon compounds by absorption and in contact with a basic compound adapted to remove acids.

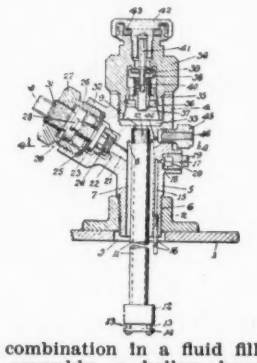
2,341,430. METHOD OF RECONDITIONING REFRIGERATING APPARATUS AND RECLAIMING REFRIGERANT. Howard M. Elsey, Oakmont, Pa., assignor to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., a corporation of Pennsylvania. Application July 19, 1941, Serial No. 403,114. 2 Claims. (Cl. 62—170).

1. The method of reconditioning a refrigerating system comprising an enclosed motor-compressor unit having a fluid-tight casing, the stator of which has burned out in the presence of a hydrocarbon lubricant and a refrigerant, which method comprises cleaning the interior of the



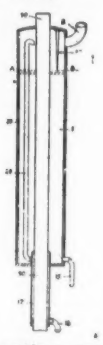
casing, removing the burned-out stator and replacing it with another stator and then operating the compressor to circulate refrigerant through the refrigerating system and in such circulation conveying the refrigerant in contact with adsorbent charcoal, calcium sulfate and a calcium compound which reacts with acids.

2,341,579. VALVE ASSEMBLY. Savin L. Sundstrom, Chicago, Ill., assignor to The Bastian-Blessing Co., Chicago, Ill., a corporation of Illinois. Application Aug. 21, 1939, Serial No. 291,177. 25 Claims. (Cl. 62—1).



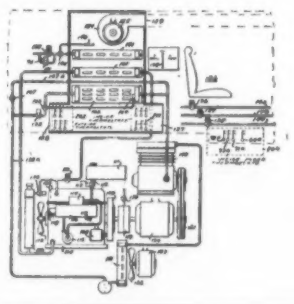
1. In combination in a fluid filling and service assembly, a hollow housing, an internal partition formed in said housing, a perforation there-through, a filler tube positioned in said perforation and extending out of said housing, a filler valve positioned in said housing on the side of said partition opposite to said tube, yielding means normally holding said valve closed, a passage-way formed in said housing separate from its hollow interior, a tube positioned in said passage-way and extending in the same direction as said filler tube and having its outermost end less distant from said housing than the outermost end of said filler tube, said passage communicating with the exterior of said housing and a valve removably positioned in said passage.

2,341,595. REFRIGERATING APPARATUS. Giusto Catalani, Genova-Bolzaneto, Italy; vested in the Alien Property Custodian. Application Feb. 21, 1940, Serial No. 320,181. In Italy Feb. 22, 1939. 2 Claims. (Cl. 62—119.5).



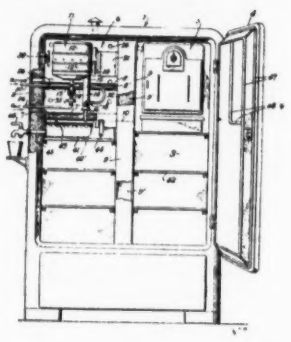
1. In a refrigerating apparatus of the absorption type, a boiler for the separation of the refrigerating gas from the liquid and comprising a cylindrical body, an inner tube tightly connected to said body and in which the source of heat is located, a second tube surrounding the lower portion of said inner tube and tightly sealed onto the same, said second tube extending upwardly within said boiler between the cylindrical body and said inner tube, and a conduit extending upwardly from said second tube, along the whole length of the boiler and opening out in the upper part of the same.

2,341,781. REFRIGERATING APPARATUS. James R. Hornaday, Dayton, Ohio, assignor to General Motors Corp., Dayton, Ohio, a corporation of Delaware. Application Nov. 30, 1939, Serial No. 306,913. 10 Claims. (Cl. 257—3).



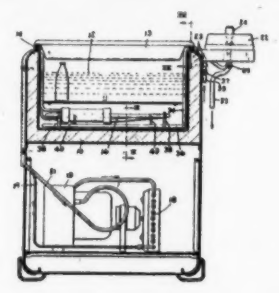
8. In combination, a heating system comprising heat dissipating means, a cooling system comprising an evaporator, compressor and condenser connected in refrigerant flow relationship, means for circulating air for an enclosure in heat transfer relationship with said heating and cooling means, thermostatic regulating means adapted to maintain a selected temperature within the enclosure, comprising thermostatic means selectively operative to control the flow of heat from the heating system to the enclosure, and thermostatic means selectively operative to control the refrigeration system, said thermostatic means lapping in their control functions to provide a plurality of temperature ranges in which either heating or cooling or cooling plus heating can be obtained, and thermostatic means outside the enclosure for selectively determining which of the temperature ranges of the inside thermostats shall be active according to prevailing outside temperatures.

2,341,872. HOUSEHOLD REFRIGERATOR WITH DISTILLED WATER DISPENSER. Edmund B. Kasold, Los Angeles, Calif. Application April 1, 1942, Serial No. 437,101. 3 Claims. (Cl. 257—10).



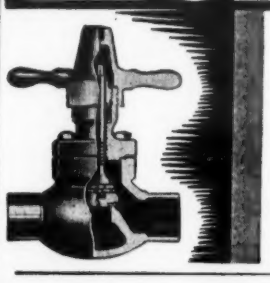
1. In a household refrigerator having a housing enclosing a refrigerated space, the combination comprising: a water still located within said housing; heat-insulating wall means separating said still from the refrigerated space; a coil disposed within said wall means; a distilled water receptacle located within said refrigerated space; water supply means connected to said coil; a pipe connecting said coil to said still; a pipe extending through said wall means to conduct distilled water from said still to said receptacle; and a water outlet pipe connected to said receptacle.

2,341,961. REFRIGERATION APPARATUS. Elo C. Tanner, Springfield, Mass., assignor to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., a corporation of Pennsylvania. Application Dec. 2, 1941, Serial No. 421,282. 8 Claims. (Cl. 62—141).



1. In a unit for draught liquids, said unit being adapted for attachment to a cooler for packaged beverages, the combination of a spout, a catch basin connected to said spout to collect liquids issuing therefrom, a drain for said catch basin, a pipe for supplying a liquid to said spout, said pipe having a portion extending sidewardly beyond said catch basin and a downwardly-extending portion at the extending end of said sidewardly-extending portion, a reservoir means at the lower end of the downwardly-extending portion, said reservoir means comprising walls of good heat-conducting material and of relatively large heat-dissipating surfaces and a tube for supplying said reservoir means with a liquid under pressure, said tube having an upwardly-extending portion communicating at its lower end with said reservoir means and a sidewardly-extending portion at the upper end of said upwardly-extending portion and at substantially the same elevation as said sidewardly-extending portion of said pipe.

(To Be Continued In a Future Issue)

Henry
Wing Cap Valve... TYPE 203

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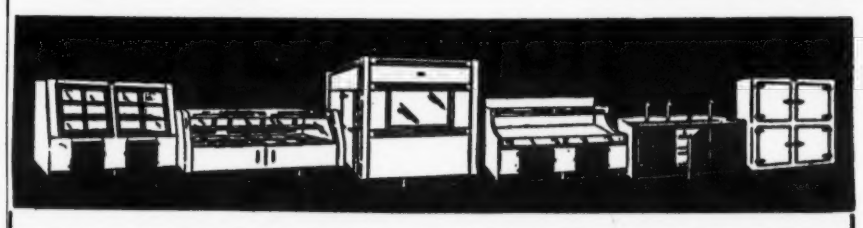
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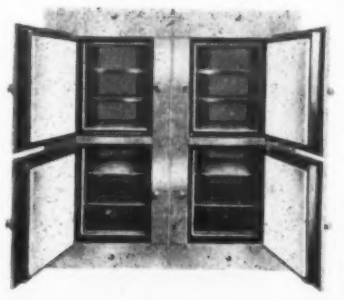
Model RL-60
Capacity: 60 cu. ft.
Other Models from 30 to 90 cu. ft.

FTC Attacks Costs Of Distribution

(Concluded from Page 1, Column 4)

which bears on this point reads as follows:

"The average cost of distribution for household electrical appliances from the manufacturer through the wholesaler to the retailer to the consumer in 1939 was approximately 53.35 cents of the consumer's dollar. Of this total the manufacturer's cost was 10.16 cents, wholesaler 12.68 cents, retail dealer 30.5 cents.

"The average margin of profit was 4.56 cents for the manufacturer, 1.09 cents for the wholesaler, and 1.11 cents for the retailer, or a total of 6.76 cents out of each consumer's dollar.

"Consequently the total margin covering cost and profit from the manufacturer to the consumer was 60.11 cents.

"Two manufacturers selling their product direct to the retail dealer reported lower costs and margins than manufacturers selling through wholesale dealers alone or partly through wholesalers and partly direct to retailers.

"The cost of these two more efficient manufacturers, including provision for bad debts, in 1939, based upon the consumer's dollar, was 12.64, the manufacturer's profit 13.33 cents, the average retailer's margin 31.62 cents, making a total margin from manufacturer to consumer of 57.59 cents, compared with 60.11 cents for all manufacturers.

"In other words, the two more efficient manufacturers made average profits of 13.33 cents compared with the average of 4.56 cents for all manufacturers, while the consumer benefited to the extent of 2.5 cents per average dollar of sales.

"In this connection it is interesting to note that one manufacturer of electric refrigerators, after a study of its distribution costs in 1939, began direct sales to dealers and at the same time reduced its prices materially, which price reduction was soon met by several competitors."

The figures and information given on cost of distribution are loosely-drawn, with no effort made to distinguish between the various types of dealers and wholesalers. Statements are made to the effect that "56 wholesale distributors had an average cost of distribution of 18.55 cents" and "82 retail dealers in 1939 had an average cost of distribution of 30.51 cents." It is obvious that different kinds of dealers and distributors might have widely varying costs, but no breakdown of this sort is presented.

Other parts of the report which touch upon vital elements in appliance merchandising were these:

"Many types of wholesalers and retailers were attracted to the electric household appliance trade by the large margins of profit allowed canvassers and demonstrators. Sales to distributors were generally outright sales. By 1939, almost 60% of all electric appliances produced in the United States were sold to independent wholesalers and jobbers.

"Direct sale to retailers is now extensively practiced by numerous manufacturers. Manufacturers selling in this way over large territories often maintain branch warehouses and sales offices from which their salesmen operate. In 1939, about 18% of all household appliances made in the United States were sold in this manner.

". . . The different methods of distribution utilized by manufacturers have changed and broadened as electric appliances ceased to be regarded by the public as novelties and became accepted as virtual necessities. The stockroom, servicing station, and manager's office used in canvassing tended to become a retail specialty store selling over the counter. As the possibilities of over-the-counter sales increased, department stores, hardware stores and, in the cases of some types of appliances, gift shops, drug stores and, more recently, garages and filling stations, began handling electrical appliances.

". . . On the larger, more expensive appliances, respecting which promotional activity is considered a primary function of the distributor and dealer, so-called franchise agreements between manufacturers and distributors are practically universal.

"Schedules of suggested prices on different appliances and models and discount sheets are provided but, in general, there is no attempt on the part of manufacturers to maintain minimum prices by resale price maintenance contracts."

WPB Changes Priority On Small Motors

(Concluded from Page 1, Column 5)

conditions (or scraps it promptly when repair is impracticable)," delivery of a new motor to the seller is specifically authorized by WPB.

"It must be noted that no repairman or other person may deliver such an item unless he either complies with the foregoing conditions, or receives a AA-5 or higher rating for the delivery from his customer, even though he has obtained the items under a regulation or order which assigns a rating for repair or maintenance purposes, such as the following: CMP Regulations 5, 5A, or 9A; or Orders L-79, P-126, or P-148.

"This exemption permits a dealer not having repair facilities to deliver such a traded-in motor or generator, if it is repairable, to the manufacturer or some other supplier who will repair it or have it repaired within a reasonable time, and get one in exchange without a AA-5 or higher rating. The manufacturer or other supplier who is asked to deliver a new item to a dealer in exchange for a used one is responsible for determining if the traded-in item is repairable."

The higher priority rating also does not apply to the delivery of repair parts for any item, but WPB points out that "no complete item may be considered as a repair part and delivered under this exemption, even though it could be used as a component part of another item or of machinery not covered by this order."

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When it's taps for Hitler it will be tops for you. Consider that well over 95% of all retail stores DO NOT HAVE AIR CONDITIONING . . . and there are 500,000 retail stores in America. Consider that restaurants, hotels, office buildings, apartments and private residences present almost virgin territory.

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PENGUIN PETE

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HEAT TRANSFER PRODUCTS

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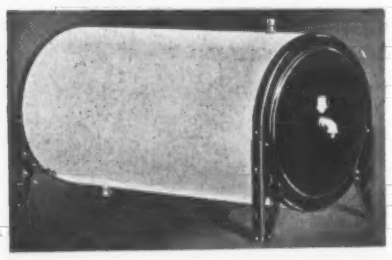

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TECHNOLOGY DEPT.

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Air Conditioning & REFRIGERATION NEWS

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